TELEPHONE ENGINEER

Volume XV CHICAGO, JUNE, 1916 Number 6

More Automatic Telephones for Cuba

The Cuban Telephone Company has just placed an order for 1000 lines of Automatic equipment as additions to its present Girdless system.

This company began operating the Automatic, in one exchange, in 1910. At that time they had less than 6000 telephones in service.

Today—six years later—this Company is operating Six Automatic Exchanges, with an aggregate of 20,000 stations connected.

This record—like that of the Ohio State Telephone Company, which has just installed four new Automatic Exchanges, and the Dakota Central Telephone Company, which has just put in its fifth Girdless plant—prove the fact that

The more a Telephone Company knows about Automatic the better they like it.

No endorsement can be greater than this.

Automatic Electric Company

CHICAGO

"DIAMOND X"

EXPANSION SHIELD

for

LAG SCREWS

Equal Results at Lower Cost

REDUCES
Original Cost of the Expansion Bolt
Diameter of hole to be drilled
Cost of drilling
Time required to install
Your total cost of making attachment

PATENTED

Oct. 5, 1915 { U. S. Pat. No. 1,155,613
U. S. Pat. No. 1,155,614
U. S. Pat. No. 1,155,615

Screw enters shield on center

Screw emerges at side and contacts directly with wall

This new expansion shield is designed for heavy work. Its simplicity, being composed of but one single unit, will recommend it to telephone engineers for construction work requiring attachment of equipment to stone, brick or concrete buildings.

Its principle of operation is the most radical development in expansion bolt design. The screw contacts on one side directly with the hole in the wall. The enormous displacement of metal at the further end is what gives it its powerful expansion at the inner end, where it is most needed.

SEND FOR SAMPLE.

Diamond Expansion Bolt Co.

Manufacturers Diamond Specialties

90 West St., Cor. Cedar, New York

Western Electric Company

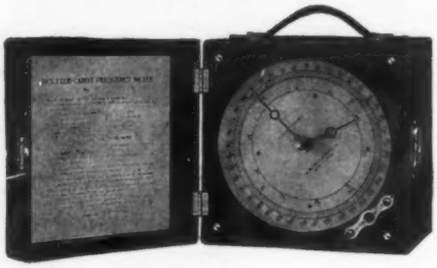
INCORPORATED

New York	Atlanta	Chicago	Kansas City	San Francisco
Buffalo	Richmond	Milwaukee	St. Louis	Oakland
Newark	Savannah	Indianapolis	Dallas	Los Angeles
Philadelphia	New Orleans	Detroit	Houston	Seattle
Boston	Birmingham	Cleveland	Oklahoma City	Portland

Pittsburgh Cincinnati Minneapolis St. Paul Omaha Denver Salt Lake City

EQUIPMENT FOR EVERY ELECTRICAL NEED
Member Society for Electrical Developments. "Do it Electrically"

War Hasn't Cut Off the Entire Supply of Frequency Meters —We Still Make them



¶ The reason you should buy the Holtzer-Cabot Frequency Meter is because it's so accurate. This is no idle boast—it has to be accurate. Why? Because it not only counts, but it **records** every alternation. Records are the things that count. All through life we depend on them, and the electrical man knows their value better than some of the rest of us. Therefore when he "goes to market" for a Frequency Meter, he doesn't pick out the one that depends upon reeds, or another that has to do with electrical tuning devices, but he buys the Frequency Meter that not only tells him the "facts of the case" but actually records them.

He's a wise purchaser who calls for "Holtzer-Cabot"

The Holtzer-Cabot Electric Co.

Chicago, Ill. and Boston, Mass.

STANDARD
Colonial Copper Clad Wire

TRADE **C.C.C.** MARK

has satisfactorily met the requirements of large and discriminating buyers for many years. Its economy in installation and maintenance has therefore been proven by years of exacting service tests. There may be many places in your telephone system where C. C. C. Wire can be economically employed.

For further information write our nearest office for new C. C. C. Bulletin No 202.

Standard Underground Cable Co.
Pittsburgh, Pa.

Boston	Philadelphia	Chicago
New York	San Francisco	St. Louis

AWARDED PANAMA PACIFIC GRAND PRIZE

W & M Telegraph and Telephone Wire.

Strand and Pole Steps.

Made by

American Steel & Wire Company

Chicago New York Cleveland Pittsburgh Worcester Denver

Export Representative: U. S. Steel Products Co., New York
Pacific Coast Representative: U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle

Editors: ED. J. MOCK, PAUL H. WOODRUFF
New York Representative: CHARLES R. CONDON
New York Office, 1022 Longacre Building
Forty-second St. and Broadway
Telephone Bryant 7030

This publication is free and independent of all business or house connections or control. No manufacturer or supply dealer, or their stockholders or representatives, have any financial interest in Telephone Engineer or any voice in its management or policy.

Entered at Chicago Post Office as Second Class Mail Matter

Telephone Engineer

WITH WHICH IS CONSOLIDATED
The Western Telephone Journal
ESTABLISHED 1902

PUBLISHED MONTHLY BY
ELECTRICITY MAGAZINE CORPORATION
MONADNOCK BUILDING, CHICAGO, ILL.
Telephone: Harrison 3014—All Departments

NOTICE TO ADVERTISERS

Changes of advertising copy should reach the office of publication not less than ten days in advance of date of issue. Regular date of issue, first day of each month. New advertisements will be accepted up to within five days of date of issue, but proof of such advertisements cannot be shown in advance of publication.

SUBSCRIPTION PRICE
Per Year $2.00

Canada	$2.50
Foreign	3.00
Single copy	.30

FOR SALE AT ALL NEWS STANDS

NOTICE TO SUBSCRIBERS

REMITTANCES—Remittances should be made by check, New York draft or money order, in favor of TELEPHONE ENGINEER. Foreign subscriptions may be remitted direct by International Postal Money Order.

CHANGE OF ADDRESS—The old address should be given as well as the new, and notice should be received two weeks in advance of the desired change.

If Your News Dealer Will Not Supply You—Please Notify Us

VOL. XV CHICAGO, JUNE, 1916 NO. 6

Localize the Independent Investments

A PATHETIC figure in all seriousness is the officer of an Independent operating company who does not control his own stock, and whose plant, to which he has devoted the best of his life, is suddenly sold to the Bell interests over his head. That condition is not unknown in Independent history; and perchance it may happen again before the Bell non-purchase commitment is taken seriously.

When a telephone man has fought his fight while the fighting was easy, and then succumbs to the "golden lure" of the opposition as soon as its glitter grows strong enough; when he sells out to his own advantage and to the serious embarrassment of the friends and associates whose co-operation has made him successful—then we can condemn him whole-heartedly and in strong language. But how about the man who has fought the same fight, and enlisted the help of the same kind of friends, and won—and then, over-night, finds his company Bell-owned because it was controlled by a distant stockholder?

Not all successful Independent companies are locally owned. Independent securities have not always been easy to sell—nor are they today. The money which makes possible an Independent success may come a thousand miles or more, and it may be interested only in the dividends it draws or the increase in its value. When the increase comes in the shape of an offer from the opposition, it is just as welcome as the advances of a friend, and then the man who is known as standing for the Independent company, whom everybody, possibly, thought was the company, becomes the central figure in a merger case—an Independent disgrace.

It is an old and trite story. It has happened and will happen again, and when the conditions favorable to it have once been established there is little hope of preventing it so long as competitive mergers are allowed by the government. The cure goes back to the time of financing. The Independent organizer possessed of foresight, prepared against disaster, will not let the control of his company pass out of his own community if he can possibly help it.

The Independent infant of years ago grew up and got its strength on local ownership. That was, indeed, the slogan of the government. Possibly even those who used the argument did not realize what it meant. They thought it a pretty sentiment, a matter of civic pride and patriotism, and a practical appeal to the investor who liked to keep his eye on the daily conduct of his investment. But they did not see—not all of them, anyway—that it meant, besides, the perpetuating of the Independent spirit—the bonding together of pride and loyalty and contentment, the things that make for stability.

What hope is there that the Independent company controlled by Wall street money, or La Salle street money, or The Bourse money, will remain Independent? Only the hope that the investment will pay more than another of equal security, or appreciate with greater speed. When rates and dividends are standardized by official regulating agencies there is little prospect of bigger returns than other investments offer—and the only prospect of extraordinary appreciation is by sale to an eager and opulent opposition.

Whether credit be due to sentiment or sound common sense, we know that the locally owned and controlled Independent company is more apt to remain Independent, and its stockholders much less liable to temptation.

Quite frequently the foreign money is the easiest. The man a thousand miles away with

a hundred thousand to invest is easier to get than a hundred men with a thousand apiece at home. But in this, as in many things in life, the harder course is the safest. The "Home" company should stay at home financially—which, we take it, is what the word originally meant.

Better a little more effort now, a little more home campaigning, a few more stockholders at a little lower per capita investment, than a lifetime of constructive work crowned with a beautiful and successful Independent system—a thing of pride—sold out!

Why Not Hold the Convention in October?

THE by-laws of the United States Independent Telephone Association provide that the annual meeting and convention of the association shall be held at such time and place as may be designated by the board of directors. Having this freedom of choice, it appears to us that the directors would gain both attendance and friends by establishing the practice of holding the convention in October.

Telephone men are busy most of the time. There is always something or other to occupy their minds, their hands and their hours. But there are certain times when they are busier than they are at other times. In the storm periods, and the construction period, and the period of preparation for storm, they are well occupied at home. During the winter months, when the national conventions have been been held for many years, emergencies are quite apt to arise which make attendance impossible, even though previously arranged for. And spring being the expansion season, time is at a premium then and will not inconvenience itself even for a few days.

Midsummer as a convention time has no objections beyond the purely human one of lassitude and indifference. While some energetic individuals seem immune to those effects, enough are under the spell to make attendance small and unprofitable in comparison with more favorable periods.

Of all months of the year, it seems to us that October offers hope of the highest convention efficiency. Then construction work is all cleaned up, storms are of minor importance, and winter preparations are not yet begun. If there is ever a lull in the proceedings at home, it is then. The cool weather returns energy to the delegates, and thoughts of winter make activity brisk. Attendance, we are sure, would be greater then than at any other time.

There is no reason that we know of why the United States Independent Telephone Association should not hold its annual conventions in October—and we have tried to show that there are several reasons why it should. We hope the board of directors will consider this question seriously at their next meeting, and that October, 1916, will be decided upon as the month of the association's second convention.

The Entering Wedge in the Metropolis

INDEPENDENT telephones are denied access to the biggest city in the United States. No confirmed resident of Greater New York has ever known anything at all about Independent progress or Independent apparatus. They have never even heard that some of the best telephone equipment in the world is made in Independent factories.

But in spite of the Bell company's exclusive franchise in the big city, in spite of the present impossibility of getting the use of its streets for an Independent, an educational wedge has entered the heart of New York. The business interests of the metropolis are beginning to realize that all is not Bell that talks. In the big offices and plants and docks Independent telephones are working now; and gradually their use is growing and extending. The streets they may not cross; but within the great buildings they are as busy as though they were public instead of private utilities.

We are speaking, of course, of the intercommunicating telephones—the insignificant brothers of the public servant. We have never paid much attention to intercommunicating. Its problems have always been small and technical. The big questions of the industry are

over its head. The exchange manager knows it not, and cares as little for it, for it is outside his bailiwick. And then, as we said before, it is not a public utility, but a private convenience amounting in big business to a necessity. And being private, it needs no franchise, has no rates, makes no reports.

But an intercommunicating telephone is a telephone, nevertheless. It must be quick and simple and efficient—therefore it must demonstrate the skill and ingenuity and ability of its makers. A good intercommunicating telephone must represent a good telephone system.

New York, within the last few years, has adopted many automatic intercommunicating telephones—and everybody, even in New York, knows that automatics are Independent. In that field there is competition, and it is the choice of the buyer that wins in each case.

So New York's business men, many of them, are learning facts about the dial telephone. They are learning that there are some things telephonic that their local Bell operator cannot supply—and that those things are Independent.

We do not anticipate any political or economic upheaval because New Yorkers, in their own business, have discovered the virtues of Independent apparatus and are using it where no franchises interfere with their choice. New York does not move so easily. But it may have its effect, even so. If men talk shop the reputation of the inside telephones will spread, and some of them will learn that west of Hudson's river are whole communities that use those same telephones over miles of wire strung along highways as important, relatively, as Broadway.

And if they like their Independent telephones better than their Bell outside telephones, they will wonder, no doubt, why some of those crude, raw, quite impossible western cities can enjoy privileges denied to them.

There are other Independent intercommunicating telephones in New York besides the automatic, and their service is satisfactory. But we mention automatic because it must be admitted that it is the spectacular element in telephony. It is different, and attracts attention.

So even a New Yorker, who thinks all telephones are Bell, must observe that this new instrument he has bought is not at all like the one he rents from the service company. That alone should move the normal human being to ask questions, to find out why he is not allowed to use outside the apparatus that serves him so well inside.

Use Your Local Newspapers

ON occasion we have deplored the general lack of consistent newspaper advertising by Independent operating companies. While a good many do advertise, and some of them quite lavishly, at certain times, they are not as a rule steady users of newspaper space. However, that they advertise at all, if only once a year, admits them to the newspaper publishers' circle of business friends.

Newspapers, as a rule, are glad to have their business friends co-operate with them in furnishing reading matter that will interest the public. Practically every Independent operator who is acquainted with his local newspaper editor could get more news into the paper than he does. And all Independent operators, without exception, have more to tell that would make interesting reading than they do tell.

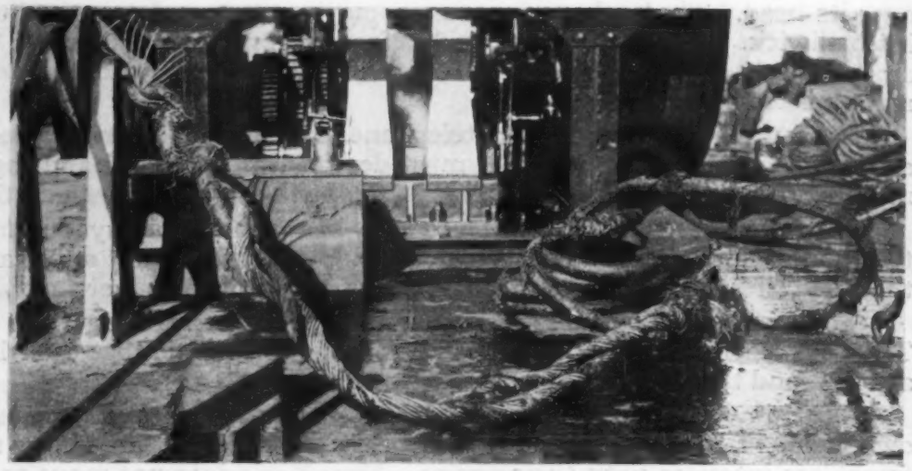
The most efficient telephone man will take advantage of every opportunity to get the name of his company and the fact that it is Independent into the reading columns of the local papers.

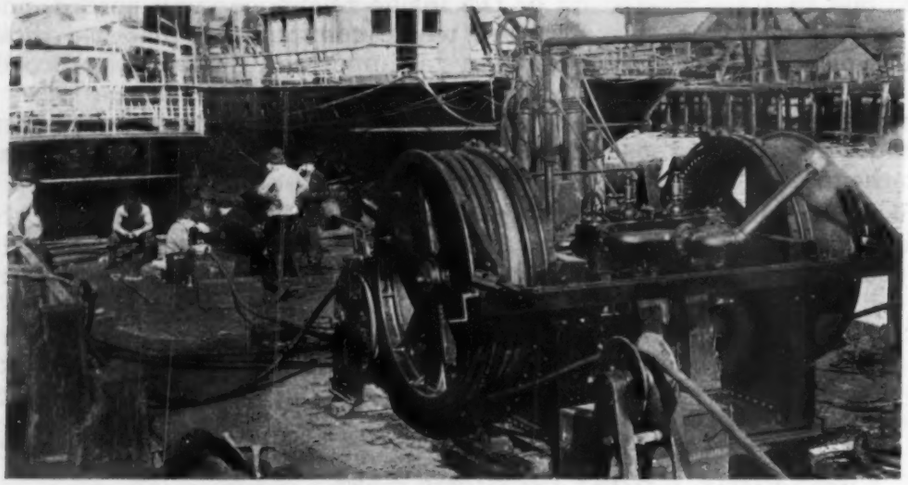
The most Independent-spirited telephone man will not stop there—he will get all the reading matter he can into the papers on the general subject of Independent telephony.

Independent telephony has a most interesting and exciting history—and the excitement is not all over yet. It is full of good newspaper stories, that need only the preparation of their "copy"—or perhaps merely the cultivation of a reporter's friendship and a little conversation now and then.

Here is something that, diplomatically managed, costs nothing and that benefits the local Independent company and the whole Independent movement at the same time. It is worth trying and trying again until it "gets across."

A serious case of submarine cable trouble occurred in the British Columbia Telephone Company's system on March 25, when the fifty-pair cable under Burrard Inlet between Vancouver and North Vancouver was fouled by the anchors of the barge Melanope. The Melanope had been anchored for some time with two large anchors near the ballast ground on the north side of the inlet. Swinging on the tides as she did for months, the two anchor chains became twisted together, and when it was decided to bring the Melanope down for service it was found that the anchors could not be raised on account of the two chains being twisted, each chain leading through a separate hawse pipe to a different winch. The tug Nanoose apparently attempted to untangle the two chains by swinging the Melanope around, with the idea of untwisting the anchor chains. In the course of turning the Melanope the anchors were broken out at the bottom at various times and each time the barge would drift toward the First Narrows, dragging the anchors along the





bottom of the inlet. Finally the drift carried her over the location of the cable and the anchors fouled. Then as the work was continued of turning the Melanope, every time she was swung around an additional twist was thrown in the cable, producing the section shown in the illustration above. All Monday was spent in picking up the cable to the trouble, and when the damaged portion was on board a cut was made. Additional cuts had to be made to get all the trouble out, and the splicing of the new cable was completed about 5 o'clock Tuesday morning, with two splices. Relaying was started on Tuesday morning, but the new cable cut in was just long enough to reach the North Vancouver ferry slip, which necessitated the splicing of another short section of submarine to reach the shore. To supply continuous service to sections reached by submarine cable, provision must be made for accidents such as these, which, while they cannot be foreseen by the company, are always anticipated.—Telephone Talk.

The way temporary toll service was given at Paris, Texas, after the ten million dollar fire that destroyed forty residence and business blocks, including the plant of the Southwestern Telephone and Telegraph Company, March 21. This curbstone "exchange" was put into operation while the fire was burning. Calls to Dallas, Waco and Fort Worth went through this central office made up of two farmers' line telephones.—Southwestern Telephone News and Western Electric News.

Field Telephone Receiving Message from Headquarters Staff, British Royal Engineers, "Somewhere in France." Photos by courtesy of the American Telephone and Telegraph Company. The Man in the Field is a Member of the Telephone Signal Corps.

STORIES IN PICTURES OF TELEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.

Transmitter of the Instrument that is Installed just Beneath the Pulpit—Mountain States Monitor.

Mrs. MacFarland, Aged and Bedridden, Hears the Sermon of Rev. Tanner in the First Congregational Church of Denver, Through the Kindness of the Mountain States Telephone Company. Note the Megaphone Mouthpiece on the Telephone

Chatham, Virginia, Had a Real Cyclone About a Month Ago, and Telephone Poles Were Snapped Off as Though They Were Pipe-Stems. The Illustration Shows Just One of Numerous Strange Vistas After the Cyclone Had Done Its Best to Turn the Town Upside Down. The Exchange Itself of the Chesapeake and Potomac Telephone Company Was Damaged by the Storm. —The Transmitter.

On April 15th the Fairfax Exchange of the Falls Church Company in Virginia Was Completely Destroyed by Fire, Throwing Out of Service 44 Lines and 87 Stations. The View Shows Linemen Restoring Service After the Fire.—The Transmitter.

STORIES IN PICTURES OF TELEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.

Ask Connections After Chicago Merger

Independent telephone companies have submitted to the Chicago Telephone Company the general provisions which they contend should be contained in any order approving or consenting to the sale of the automatic telephone property of the Chicago Tunnel Company to the Chicago Telephone Company.

Among the provisions are that all independent lines having connection with the tunnel company shall be physically connected with the lines and telephones of the Chicago Telephone Company; that the telephone company shall receive all incoming toll and long-distance calls tendered it by the Independent lines; that outgoing toll calls shall, at the request of the caller, be handled so as to give the Independent lines the longest possible haul, and that all calls be given the same efficient service as when routed over the Bell system.

William P. Sidley, attorney for the Chicago Telephone Company, turned a copy of the conditions over to the officials of the concern and stated that an immediate decision could be expected.

Arrangements for that purpose are expected to be made at conference between representatives of both interests to be held soon.

If such an arrangement can be made, it is understood the Independents will no longer oppose the purchase by the Chicago Telephone Company of the automatic telephone from the Chicago Tunnel Company.

If the sale of the properties of the automatic telephone to the American Telephone and Telegraph Company is consummated the Illinois Telephone and Telegraph Company—the automatic—will not go out of existence, but will keep one exchange open for the operation of the tunnels.

This fact was brought out at the hearing on the proposed sale by the public utilities commission. S. W. Tracey, vice-president of the Chicago Tunnel Company, the Illinois Telephone and Telegraph Company and the Chicago Warehouse and Terminal Company—for which the Chicago Utilities Company is the holding company—made the statement.

The Indianapolis Reorganization

The Ohio State Telephone Company has not bought the Indianapolis Telephone Company, reports to the contrary notwithstanding, according to a statement issued May 11 by Samuel G. McMeen, president of the Ohio company. He said:

"The Indianapolis Telephone Company, formed last week by the merging of three independent telephone companies, heretofore operating in Indianapolis and central Indiana, will extend its operations by substantial additions to its property. It will conduct an important long-distance business in co-operation with the Ohio State Telephone Company, but the latter company has not, as reported, acquired ownership or control of the new Indiana company. Stockholders of the Ohio State Telephone Company are understood to be making considerable investment in the offerings of preferred and common stocks of the new Indianapolis company. This fact may account for the impression that the Ohio company has bought the Indiana telephone properties."

However, it was announced at Columbus, May 10, that the merger of three independent telephone companies of Indiana with the Ohio State Telephone Company had been completed. It was stated that the directors of the Ohio State Telephone Company authorized offering its shareholders a part of the new $12,900,000 preferred and $1,150,000 common stock of the Indianapolis Telephone Company, which is a merger of the New Long-Distance Telephone Company, the New Telephone Company and the Indianapolis Telephone Company, the lines to be merged with the Ohio corporation.

The directors announced, it was said, that this stock will be offered to holders of common and preferred of the Ohio State Telephone Company.

The Indianapolis Telephone Company, which is capitalized at $8,000,000, has filed articles of incorporation in the office of the county recorder. The company is composed of the New Long-Distance Telephone Company, the New Telephone Company and the Indianapolis Telephone Company, all of Indianapolis. The new company promises to maintain, equip and operate telephone properties in every county in the state.

Is is reported from Indianapolis that the new stock of the Indianapolis Telephone Company, recently merged with the New Long-Distance Telephone Company, has been largely oversubscribed.

One of the most interesting details in connection with the reorganization of the Indianapolis Telephone Company, which has brought the local independent companies again under home ownership, is the active participation of Louis Hollweg, who was one of the largest financial supporters of the movement which resulted in the first independent telephone company in Indianapolis in 1898. Mr. Hollweg also will be one of the largest stockholders in the present merged company, and will serve as first vice-president and director. Mr. Hollweg has been identified with Indianapolis business for many years, having been active in the upbuilding of such houses as Hibben, Hollweg & Co. and Hollweg & Reese. During these years he also has been active in the work of the independent telephone companies.

Commissions for New Business

The Mountain Home Telephone Company, operating in New York state, recently made the announcement to employes throughout the territory covered by the company's lines that during the months of May and June a commission of 5 per cent of all new business secured would be given to the employe through whose efforts the new business was made possible. This offer applies only to the employes of the traffic and plant departments. This plan was adopted with success by the company last year and in again making the plan effective in 1916 the company believes that its business will make a decided increase. At the end of the two months the employe who has received the largest amount of new business will be presented with twenty dollars in gold in addition to the regular 5 per cent commission.

Within the jurisdiction of the company there are five head offices, at Ogdensburg, Plattsburgh, Pottsdam, Saranac Lake and Malone. To the office securing the largest amount of new business during the months of May and June will be awarded twenty dollars in gold to each of the commercial office staff. The members of this department are not included in the 5 per cent offer.

St. Paul Cuts Over to Automatic

Tri-State Stronghold Puts 22,000 Subscribers on Dial

AT midnight on the twenty-seventh of May the entire system of the Tri-State Telephone and Telegraph Company in St. Paul, Minn., the company's home city, was cut over from manual to automatic equipment.

The company operates five exchanges in St. Paul, all of which were, of course, involved in the big cut-over. The technical problems involved will have to await a more extended explanation later—and they are surely interesting enough to deserve special treatment. The mere routine of the big cut-over is interesting in itself, however; and so much we can describe at once.

At 12 o'clock the battery was thrown off the entire manual system located in the five exchanges, and the attendants then proceeded to cut the jumper wires which connects the subscribers' lines to the manual equipment. As soon as this was accomplished the battery was placed on the automatic system and men were assigned to the duty of removing the toothpicks which, up to this time, had held open the connection between the subscribers' lines and the automatic apparatus. In exchanges where new main frames had been installed these toothpicks were in the protectors, but in the exchanges where the old frame is retained, the toothpicks had been inserted in the line switches. The process and result were practically identical in either case.

Upon the removal of the toothpicks from any particular line, that line was immediately in full service. However, in the few cases where any fault developed, such as receiver off the hook or a short on the line, the toothpick simply was restored until the condition could be cleared. Approximately seventy men were engaged in this work, and as everything proceeded normally, the entire cut-over was accomplished in about a half hour between midnight and morning.

As was remarked before, the cut-over involved five offices, which serve some 22,000 subscribers in St. Paul. Approximately 15,000 lines of central office equipment were cut.

Officers of the Tri-State Telephone and Telegraph Company

In connection with the installation of automatic equipment in St. Paul, the Tri-State Telephone and Telegraph Company has carried out quite an extensive building campaign, including the enlargement of its Park building with a fireproof addition of approximately the size of the original structure.

This modern telephone exchange building houses the automatic central office equipment for the Park ex-

change, together with the toll board for the entire St. Paul-Minneapolis area, and in addition the building contains the executive offices of the company. It is a strictly modern, fireproof building of brick and concrete construction with Bedford stone trim.

To house the East exchange a new building located one-half block from the old site has been constructed. This is 40 by 60 feet in dimensions, and at present is one and one-half stories in height, and is so constructed that another story can be added when desired. This building is absolutely fireproof, of brick and concrete material, and is particularly attractive in design and harmonizes well with the residential region in which it is located.

The most interesting construction work conducted by the Tri-State Company is that done at the Dale exchange, which was originally a one and one-half story building with a gable roof. Nineteen feet has been added to it along one side, a flat roof with parapet has been put on, and except for that portion of the floor actually occupied by the manual switchboard, it is absolutely fireproof. This transformation was carried on while the operators continued to perform their regular duties, and without the least interruption in the service.

All these exchanges are now being operated on automatic.

Los Angeles Merger Plans

The Pacific Telephone and Telegraph Company, a part of the Bell system, and the Home Telephone Company, the Independent concern in Los Angeles, Cal., are about to consolidate, the Southern California Telephone Company, a new corporation, having made application to the state railroad commission for permission to issue $12,000,000 worth of bonds, it being stated that part of these bonds are to be used to purchase the two telephone systems.

It has been supposed for some time that these two systems would eventually unite, in some form, and the merger is taking place at this time, doubtless, for the reason that the franchise of the Pacific Telephone and Telegraph Company expires during the coming year, while that of the Home company continues for twenty-five years. The Home company operates the automatic telephone. The territory covered by the merger includes the cities of Los Angeles, Watts, Vernon, Eagle Rock and Huntington Park. The number of telephones involved is 128,000, of which the Home company has 60,000 and the Bell company 68,000. The new company, the Southern California Telephone Company, is incorporated for $30,000,000, of which $10,000,000 will be stock and $20,000,000 bonds. Permission is asked to isue at once $7,821,000 in stock and $8,427,000 in bonds. As set forth in the application to the railroad commission by the new company, the purchase price of the Home company's property is $7,711,000, and the amount to be paid for the Bell company $7,544,000.

Bell Wants to Use Independent Lines

E. F. Veatch, Kentucky state manager of the Cumberland Telephone Company, visited Lexington last month for the purpose of discussing the consolidation of the Cumberland and Fayette Telephone Company's lines from Lexington to Richmond and Kentucky River points. The Cumberland company's line to these points has come, according to Mr. Veatch, to the point of age where it will have to be replaced, and his company believes that by doing away altogether with its line and causing the service to be over the lines of the Fayette company exclusively, the service would be much better and would do away with competition.

Convention of Railway Telegraph Superintendents

The Association of Railway Telegraph Superintendents will hold its next annual convention at St. Paul, Minn., June 20, with headquarters at the St. Paul hotel. At the Rochester convention last year it was decided to hold this convention for three days, June 20, 21 and 22, but owing to the press of business and other matters requiring the attention of the members, it is likely that four days will be given to the work. The various special committees will make their reports and the discussions thereon will consume considerable time. It is the belief that the convention will be one of the best ever held.

E. P. Griffith, superintendent of telegraph, Erie railroad, New York, has been made chairman of the association's special committee on "Utility of Wires," to take the place of H. D. Teed of the St. Louis & San Francisco line, who has resigned the chairmanship on account of the press of other work. C. O. Van Derwort, engineer, telegraph department, Michigan Central railroad, has been appointed a member of the same committee. Chairman Griffith and the full membership of the committee held a meeting at Buffalo April 11 and have assured President E. C. Keenan of the association that they will deliver a good report on or about May 1.

Siamese Telephone Data

Vice Consul Carl C. Hansen, Bangkok, Siam, says that in the fiscal year 1915 Siam's telephone exchanges were four in number, and the service at the Bangkok exchange was carried on by 26 operators. The average number of connections made at the Bangkok exchange in 24 hours was 8,000. The total number of telephones installed was 794, of which 677 were connected with the central exchange, 99 were special telephones, 10 connected with the city of Nagor Pratoom, 2 with Paknam, 2 Dhanyaburi, and 4 installed at the Bangkok public call stations.

A detailed account of the total network of telephone lines is not available, owing to the gradual removal of the overhead lines and the laying of underground cables in their place. The total extent of the lines is given as 9,186.6 kilometers (5,708 miles), part of which was underground cables, part river cable, part aerial cable, and 272 kilometers (169 miles) bare wire. The gross earnings for the year under consideration were $152,847, the expenditure $136,873, and the net profit $5,910, against a net surplus of $6,553 for 1915.

C. & P. Bell Covers West Virginia

The Chesapeake & Potomac Telephone Company has been incorporated at Charleston, W. Va., with an authorized capital stock of $7,500,000.

The incorporators are F. H. Bethell of Scarsdale, N. Y., who is president of the Bell Telephone Company of Pennsylvania, and vice-president of the New York Telephone Company; H. F. Thurber of Brooklyn, N. Y.; M. N. Beuhler of Baltimore, Md.; C. H. Artz of New York City, and W. T. Williamson of Charleston, W. Va.

The incorporation of this company brings together all the properties of the Bell companies and the Consolidated Telephone Companies of West Virginia, and means the end of a competing telephone system in West Virginia.

Some Problems of Inductive Interference

Offered in Discussion Before the California Joint Committee

BY L. T. MERWIN

THERE is a lot we power men do not know about the telephone business and it is possible that there are some things that the average telephone man does not know about the difficulties that beset an operating engineer with a power company. The spirit of co-operation should be rife here, particularly toward enlightening power men on the telephone man's troubles; and telephone men themselves should co-operate to intelligently inform the power men of their difficulties. I feel quite lost when I go into the the telephone building or the central exchange, and view the wonderful complexity of the equipment required for the handling of intelligence. I venture to say that the average telephone man would also feel just as much lost if suddenly put down in a modernly equipped steam-electric station and told to operate it. There is some contrast between the minute voltages and currents that the telephone man handles and the relatively tremendous currents and voltages of a modern electric station.

All I know about telephony is what I have imbibed working with a little sixty-mile private telephone line that I had to make work. We simply had to talk to the power house from Portland and we couldn't. It was a puzzle to me. A telephone man would have put that line into shape in a jiffy and it would have been easy for him, but I am not in the telephone business. The power conductors, however, worked fine. I have heard them way over there on West Park and Alder street in the central exchange. Yes, the power conductors worked dandy, but the telephone simply would not. All I could get was a terrific roar, so I endeavored by hook or crook, blindly, to apply to the thing what the telephone people tell us must be done, namely transposition.

Our power line and telephone conductors you understand, were already strung. In building the line we had to go through very rough country along the north bank of the Columbia and merely hit the high places so that our spans varied from 16 feet to 1400 feet. Our conductor spacing varies from a 7-foot triangle to a 7-foot flat construction and then back again to a scalene triangle with a base of 15 feet and an altitude of 6 feet. No two adjacent spans were the same for fifty miles due to the configuration of the ground, and you can imagine a mere power man trying to transpose in order to get a workable telephone with those power conductors now spraddling out and now coming in closer together as we hit the high places. It can't be done. At least I could not do it. Probably a telephone man could have accomplished it.

The company was new and unlimited funds were not at my disposal but it was up to me to get that thing working. And it was in meeting and partially overcoming these difficulties that I came across and met the facts that brought me face to face with some of the difficulties the telephone man comes up against when it comes to the matter of interference from power lines.

But now suppose the long distance telephone line of the Bell Company had been along the same side of the river with our lines on the north side. Suppose they had originally been on the north bank and we had desired to put our lines through there. I wonder if it is possible by mathematical analysis to figure out a scheme of transposition that would have made the toll line usable.

The chances are that the telephone people would have followed somewhat the route of the railroad along the north bank. They would have paralleled us from Camas up as far as White Salmon. In order to have maintained their standard spacing it would have been necessary for them to follow approximately the route of the railroad. We had to get our right-of-way wherever we could. Mr. Griswold would doubtless sing the praises of the rich farm lands of California but I want to tell you that there is no land held so high in California as some of the rock piles we have to go over in getting our right-of-way. We had to take whatever we could get. The rocky points were high and irregular, so you see it is quite a complex parallelism.

Would it have been possible with our sort of a power line and spans to have figured out a scheme of transposition that would have fitted the case? Now, the power man, in this case myself, if you wish, would have had to take the telephone man's word for it that this could be done. He would say to me, "You put your transposition here—and here—and there—and another here—and put two in here," and so forth in that manner. Now, suppose that were done, would it solve the problem? Would it clear up the line? I don't know. I would have to take the telephone man's word for it. If he told me to do it and if he had a commission's power behind him which urged me on, I would have doubtless put them in just as he dictated. They would have gone in all right. Now, suppose we thought it had been worked out satisfactorily, and then after the first month's or day's operation they came around and said, "Put another transposition in here and one there and another one here, and it will be fine and dandy." Having done that we hope, of course, it would be fine and dandy. But maybe it would not, and then what?

Now this may be an exaggeration, but our line along the north bank of the Columbia River is in exceptionally rough country, and the solution of the whole problem and the overcoming of the difficulties of induction by transposition may be feasible and satisfactory to both parties, but I doubt it.

Now, from the power operators' standpoint, let me put a question. Let this represent the power house right here. Camas is eighteen miles from Portland across the river on the other side. A number of air break switches at the Camas sub-station control the two towns of Camas and Washougal, and the Crown Willamette Paper Mill with a load of some 5000 h.p. Just outside the power house at White Salmon is another. At Stevenson is another. In Portland is another. We use the air break switches to facilitate the exact location of troubles when they come. Now, according to the California rules, the operation of these switches must follow the exact wishes of the com-

munication companies. We could not operate any of these under any kind of load if it disturbed the transmission of intelligence and thus upset the routine of community life. But here is a case:

Suddenly, while sitting in my office where I have the distinction of being the chief operator, load dispatcher, and a few other things, I hear a grunt downstairs in the steam plant and I know that there is trouble; that there is a disturbance on the lines, and soon I am notified that the high line is down, or say, that the high line is not down—but the telephone bell begins to ring most violently and unnecessarily, and I immediately know that there is trouble. I telephone to Albina substation across the river and learn that we are still hanging on but that there is high voltage on the telephone lines. The power house calls up in a hurry and so does my good friend, Mr. Hendrickson, at Washougal, who operates the Farmers' Co-operative Lines. He says to me, "You have put me out of business entirely." Probably Mr. Morden will get word from the Crown Willamette Mill that his lightning aresters are shooting over, and I come to the conclusion from all this that we must have an arcing ground on the line. Now, what do I do? There is no question but that the telephone companies are in a state of disturbance, for I again hear from Mr. Hendrickson and he informs me he is in an awful fix. The farmers' lines coming into his switchboard are grounded lines and you telephone men know that he is really in distress. What shall I do? I hastily get our local manager at Camas to the switching station and tell him to telephone to the power house to take a certain amount of load—or drop a certain amount of load so that the load they generate would be equivalent to the Crown Willamette demand and leave the Portland load on the Pittock station. Then, I tell him to open air break Switch No. 3 at Camas and he reports Switch No. 3 is open, and then we open our Portland switch and find Mr. Hendrickson is still in trouble and continues to call in. All right. We close here first, then we synchronize there, and I have this switch closed and that switch open and find that Hendrickson is fine and dandy, and have located the trouble somewhere between here and there. We have not interrupted the load of the Crown Willamette Mill, nor lost out in Portland, and we disturbed the communication circuits but a few minutes in certain local quarters.

The idea of the California commission is, I believe not to disturb the channels of communication no matter what you do to your power line. But, in a spirit of fairness, I think any telephone man will admit that from the standpoint of the public it was just as important to maintain power service as it was to maintain the channels of intelligence. In this particular instance where the greatest disturbance was across the river in a sparsely settled community it was far more important to maintain power service than it would be to maintain in its integrity the channels of communication. But, the order of the Railroad Commission of California does not take into consideration the relative importance of these two things: the disturbance of the channels of communication, or the dropping of a power load. Now, I did the best I could. I probably broke two or three thousand k. v. a., wattless, in opening the switches and of course that temporarily interrupted the line or channels of intelligence.

Now, as to the charging of lightning arresters. Of course, the telephone men never have any troubles with road contractors interfering with their line by blasting operations, but we power men do, and in Washington where there has been quite a spasm of road building, we have suffered quite considerably. As a matter of fact, ninetly per cent of our troubles since the line has been in operation has been due to indiscreet actions on the part of irrepressible road contractors.

The other day out at Wind river, with the wind blowing very hard, blasting operations two hundred yards away from the line wafted a big root right across two of the conductors of the power line on a span where we had flat construction. The power house hung on its gates and tried to burn the obstruction off, a procedure not exactly approved by the telephone men but followed by power operators. Of course, I won't tell you what the average power station operator would say if he got an order: "Don't hang on there, you are interfering with Farmer Simpkins' telephone line at Washougal." He probably would hang right on. He would burn off the thing if he could, but in doing this, of course, he might cause other damage as was done in this particular instance with the lightning arresters at our Albina substation, breaking down the charging resistances and puncturing one stack of cones.

You know the cell films of electrolytic lightning arresters must be maintained, and so we had to make a makeshift connection to keep the others in service, even in crippled condition. This required frequent charging until the disabled stack was repaired. However, that would be directly against the order of the Railroad Commission of California. Lightning arresters must be charged, it says, at 2 a. m. or at sometime not here settled upon, but to be determined to the best interests of the telephone company, even at the expense of losing the balance of our arresters—that is, if this rule were strictly adhered to, but I really don't believe the telephone company would hold us to it. On a frank explanation and a statement of what the situation was they would say, "Go ahead and charge your arresters if absolutely necessary." But, I am speaking of the exact letter of the law; and under the ruling such a procedure would be unlawful.

Another point; in my haphazard investigation of this private line of ours a few things came to my attention, and I want to ask of the telephone men if it is not possible that some such procedure could be followed in the case of their toll lines. Have you made investigations for the elimination of inductive influence by means other than transposition? Have you experimented with devices that at the expense of increasing the attenuation of the talking voice practically obliterate at least the lower harmonics induced on your lines? Having done so can you not by means that are readily within your command, and that you are now using, amplify again the weakened or attenuated voice currents and bring them out with the absence of the previously disturbing harmonics? It is exactly the method and the only method I have found available that made our own private line at all usable. By means of various complex combinations of shunts, I have succeeded in obliterating the fundamental, third, fifth and seventh and the ninth harmonics, although with the ninth and higher we are getting right near the range of maximum audibility and reduce by attenuation the talking voice. However, following the same course, can that be done?

And again, is it possible that some device may be put on the line that will produce much greater at-

tenuation with the lower induced frequencies than with the average voice frequencies in the region around eight hundred cycles per second? If that be possible, why not practically eliminate all the lower disturbing frequencies and then with your audion bulbs or other means of amplification bring out again the desired voice currents to any strength desired? My firm conviction is that this can be done and without excessive distortion of the voice currents. My own feeble attempts seem to show that it can be accomplished. But, what are you going to do with the eleventh, thirteenth and fifteenth harmonics? They come right at the point of maximum sensitiveness of the telephone receiver. I don't know. You might get into difficulties there. In my own investigations I did not find any such harmonics that were troublesome. I noticed that in the report of the investigating committee there were a number of these higher frequencies in some of the lines in California, even up to the thirty-seventh harmonic.

I notice, however, that the devices I have used will improve the natural talking voice. I have a Swede operator on the evening shift at the power house and he talks English in the usual manner of the Swede, and my device improves his natural speaking voice and he expresses himself much better and his voice sounds quite like an American by suppressing some of the lower frequencies. It really improves my conversation with him. As a matter of fact, I can understand him better now over our telephone line by suppressing those lower frequencies than I could if I had him in my office and talked to him face to face.

These things come up in the powermen's experience, and we are all interested in these problems and in the possible solution of them. We want to know more about them, and if the telephone men would tell us these things and talk over with us our mutual needs, we would get along together better and do better work.

Canada's Telephone Progress in 1915

The Department of Railways and Canals has just issued its annual report on telephone statistics of the Dominion of Canada for the year ended June 30, 1915. The statistics show that reports were received from 1,396 units during the past year, as compared with 1,136 in 1914, and in every respect the returns disclose marked growth in the telephone interests of the Dominion. The

TABLE I

Province—	Government	Municipal	Stock	Co-operative	Partnership	Private	Total
Nova Scotia	..	..	29	83	3	8	123
New Brunswick	..	..	16	6	..	4	26
Prince Edward Island	..	..	4	22	..	1	27
Quebec	..	..	54	58	2	31	145
Ontario	1	50	148	209	21	63	492
Manitoba	1	5	6	15	2	9	38
Saskatchewan	1	5	310	204	..	..	520
Alberta	1	1	5	3	..	..	10
British Columbia	..	1	11	1	..	1	14
Yukon	..	..	1	..	..	..	1
Total	4	62	584	601	28	117	1,396

number and character of the various organizations which made returns for the year are shown in Table I.

The total capitalization of the telephone business in 1915 reached a total of $74,284,991, including the Bell Telephone Company, which accounts for very nearly half of this amount. There were 533,090 telephones reported as being in use in 1915—an increase of 11,946 for the year. This, the department estimates, averages one telephone to every 15.1 persons. Of the total number, 313,225 are operated by central energy, and the balance by magneto—the latter in rural districts. There were 15,072 pesons in the employ of the companies on June 30, 1915, as compared with 16,799 in the previous year.

The various organizations which go to make the total of 1,396 mentioned above are classified as follows: Government, 4; municipal, 62; stock, 584; co-operative, 601; partnership, 28; private, 117.

The following table shows the capitalization, cost, revenue, operating expenses, and other data connected with the telephone interests of Canada for 1913, 1914 and 1915:

TABLE II

Items—	1913	1914	1915
Capitalization	$59,847,004	$70,291,884	$74,284,991
Cost	$69,214,971	$80,258,356	$83,792,583
Revenue	$14,879,278	$17,297,268	$17,601,672
Operating expenses	$11,175,689	$12,882,402	$12,836,715
Remuneration	$ 6,839,308	$ 8,250,253	$ 8,357,029
Number of telephone companies	1,075	1,136	1,396
Wire mileage	1,092,586	1,343,090	1,452,360
Telephones	463,671	521,144	533,090
Employees	12,867	16,799	15,072
Persons per telephone	16.2	15.5	15.1
Persons per mile of wire	6.8	6.0	5.6

Telephone companies' net earnings, as represented by the difference between total receipts and operating cost, were $4,764,957. This was better by $350,091 than the result for 1914.

The following are the different classes of organization: Government, 4; municipal, 62; stock, 584; co-operative, 601; partnership, 28; private, 117; total, 1,396.

In Manitoba and Alberta practically all telephone interests are in the hands of the local governments. In Saskatchewan the provincial government operates all the large centers, but has not taken over the 520 small units that spread their wires over the rural sections of the province. In all the provinces there is a growing tendency toward consolidation.

Five Cents Makes a Big Difference

The number of telephone calls between Elkhart and Goshen, Ind., was reduced between 75 and 80 per cent Monday, May 1, the first day the five-cent toll charge was in effect.

The number of Goshen calls from Elkhart was seventy-eight. The daily average under free service, officials said, was 360, this figure including also the calls passing through the local office for Goshen.

Superintendent Troyer says that the plan of having one operator aside from the long-distance operator handle all of the Goshen service, is proving satisfactory, and it may be adopted permanently.

A charge of five cents for five-minute calls now is made, with an extra charge of two cents for each additional minute or fraction thereof.

Judge Michael Donlan has signed a formal order permitting the Montana Independent Telephone Company at Butte to dissolve and disincorporate. The company, which was absorbed by the Mountain States Telephone and Telegraph Company, has not been actively engaged in business for several months, but was still a corporation in the eyes of the law until after the signing of the court's decree which declared it dissolved. The application for dissolution was filed by consent of a majority of the stockholders and was endorsed by the board of directors.

European Telephone Development

Translations from the Foreign Press and Communications from European Engineers

BY FRED W. SCHOLZ

WE CAN subdivide timber in general in two classes, calling these, according to their summer garb, foliage trees, or else coniferous trees, which include all trees bearing needles instead of leaves. Another classification which is sometimes used is that of hard and soft wood. Both types have in general lines the same structure, except that the internal structure of the foliage trees, when studied under the microscope is much more complex than that of the coniferous trees. The mass of the wood in the latter group is formed of wood fibers some 1 or 2 mm. long, lying in the longitudinal direction of the tree trunk, closed at the top and bottom and tapering to either end, so that their diameter is 70 to 80 times as thin at either end as at the middle. Between these wood fibers there lie porous channels, which can be easily seen under the microscope, which are filled with rosin. In the foliage trees the cells are much more irregular. They do not lie so parallel to the trunk section, rather they lie in all directions, so that the split of the foliage tree is always less clear than that of the coniferous tree.

As regards chemical composition, the wood fiber consists of cellulose, $C_6H_{10}O_5$, and we can very well place the percentage of C (carbon) at 50 per cent, that of H (hydrogen) at 6 per cent and that of O (oxygen) at 44 per cent. The needle timber has 1 per cent more C but less O than the foliage tree. When drying the wood, the volatile portions of the sap evaporate and volatilize and contract more and more. The entire cell becomes thinner through this decrease in its content of moisture, and consequently the wood shrinks most in the direction of the annular rings and least in the direction of the trunk axis. Of special importance for the technical application of the timber are its various strengths. Table I gives a fair idea of the compressive, tensile and shearing strength of different species of timber.

It is one of the most important problems of the wood preserving industry to increase the resistance of the timber, all of which is included in the term of "wood preservation." Most timbers cannot stand the change of wet and dry weather very well. The carrier and furtherer of all the harmful and dangerous germs that help in the destruction of the pole is the sap. Microorganisms of a vegetable nature decompose the wood, causing decay, rotting, decomposition and finally the complete destruction of the pole. All these processes of decay are furthered by the cell fiber with its sap, because they give food to these microorganisms, which gradually eat their way to the innermost core of the pole. Through modern bacteriological investigations the bacteria of hydrogen—and methane fermentation have been discovered in the cellulose and even been reproduced in artificial cultures. The destruction witnessed in telephone and telegraph poles is due to these minute organisms and bacteria and various means have been taken to combat the spread of these destructive forms. Of these which comprise drying, steaming, leaching, and impregnating, the latter form is the most important. With the importance which telephone poles hold to the telephone engineer, it will therefore not be out of place to study the various forms of impregnation technique to some extent as the art is practiced. As impregnating liquids a large number of substances have been tried in the course of time, especially the solutions of metallic salts, such as mercuric chloride, copper and zinc sulphate, and zinc chloride. In addition acetates, common salt, also volatile oils rich in rosin, heavy tar oils, creosoted oils have found application. Lately the salts of hydrofluoric acid have been tried successfully to accomplish the preservation of poles.

There have been just as many processes patented for impregnating the poles. The poles have been boiled in the preserving fluid, as in the Champy and Payen processes, or else the air dried poles have been dipped into the liquid, which was either cold or else heated, as is done in the Kyan process. The preserving fluid has also been forced into the poles under great pressure, either hydrostatic or air pressure, as in the Boucherie process, or else been pressed into the wood in large boilers, as in the Burnett and Bethell process. In this latter proceeding the wood sap is either dried out of the timber through long seasoning or else the impregnating liquid forces out the sap from the timber through the employment of hydrostatic pressure. Of the large number of materials used for impregnating, comparatively few have found permanent value. What we ask of a good impregnating liquid is that it shall enter deep into the pores of the wood and shall exercise a good preserving action; it must be cheap and be able to resist the leaching action during the life of the pole. The best results have been obtained in impregnating with:

Mercuric chloride or the Kyan process.
Copper sulphate or the Boucherie process.
Zinc chloride or the Burnett process.
Heavy tar creosote oils or the original Bethell process.
Salts of the hydrofluoric acids or the Malencovic and Netzsch process.

If we consider these processes at first from a general standpoint, we will find that they exercise their function by first killing the dangerous germs in the timber by the use of antiseptic acting fluids and then preventing the attacks of new germs and bacilli by either keeping them away altogether or at least making their attack more difficult. As these substances cited fill most of these requirements, they have come to displace other processes almost universally. As the timber to be preserved in this way is used in enormous quantities for railroad ties, telegraph and telephone poles, mine timbering, etc., it is clear that the preservation processes must be cheap, as otherwise the timber would come too high in price.

The simplest process is that of Kyan, known as the Kyanization process, which employs chloride of mercury or corrosive sublimate for preservation. The process was first mentioned by Hornberg and then developed to a practical point by Kyan. The mercuric chloride, $HgCl_2$, has the most poisonous and antiseptic action of all preserving fluids known to man. Wood impregnation with this agent was first used on a large scale in 1832 by the Englishman Kyan, first in the treatment of rail-

road ties, later for poles. The poisonous nature of the sublimate excluded the use of timber treated in this way for dwellings, nor could it be used for water supply construction either for the same reason. At first the process did not seem to take very much with the industries, as the price of the sublimate was rather high. That, of course, has been obviated by the drop in price of sublimate. The Kyanization processes is the simplest process of all the preservation processes. All that is done is to soak the timber in the preservation fluid without taking the trouble of removing the sap previous to the saturation process. The immense antiseptic power of the sublimate assures the success of the application. The solution of the agent is very weak; usually only 1 part sublimate to 150 parts of water, but even then the timber cannot be saturated thoroughly. The timber must be seasoned and air dried, as the sublimate cannot penetrate into moist wood. In addition the pole or tie, or whatever use the treated timber has, must first be finished for its purpose, before applying the sublimate treatment, because, if the wood were treated after the process, the best saturated outer layers would be removed, and second the poisonous nature of the sublimate makes working impossible. For operating a Kyanization plant a very large oak or larch tank is used for the leaching process. The tank made out of heavy beams is made waterproof by strips of felt. All iron screws and bolts used in the tank must be covered, as the sublimate has a powerful reaction on iron and destroys it very quickly. Into such a tank the poles are laid on cross strips so that they touch neither the sides of the tank nor each other. Lately these tanks have been constructed of concrete, which is able to resist the action of the sublimate as well as the wood. The mercuric chloride is dissolved in hot water under constant stirring. The process takes 8 to 10 days for soft wood and 12 to 14 days for hard wood. As the sublimate decomposes under the action of light, the tank must be well sealed against contact with light. During the process the concentration of the solution is frequently tested and reduced to the proportion 1:150, when necessary. After the saturation period, the solution is pumped back into the mixing trough and the poles are thoroughly washed with running water. After impregnation the timber must be exposed to the open air for several months so that the sublimate can enter deeply into the pores of the wood. In order to determine how deep the sublimate has entered the wood, a fresh cut is taken in a treated pole and this is coated with ammonium sulphide. The mercuric chloride and ammonium sulphide form a new compound, mercurous sulphide, which has a black color and shows by this coloring how deeply the impregnation liquid has penetrated the pole.

The next process to be discussed is that worked out by the French physician, Boucherie, in 1846, applying copper sulphate. This agent is much weaker in its antiseptic power than the sublimate, cheaper than the former but still too expensive. Moreover the copper sulphate must be, like the sublimate, as pure as possible, which means a still higher price. Originally the process was applied by adjusting to the end of the pole to be treated a cap with a chamber 1 to 2 cm. in width and then placing the tank with the copper sulphate about 30 feet above the end of the pole. The pole was then saturated with the solution by using a rubber tubing or pipe. The copper sulphate entered the pole under a pressure of 1 atmosphere and filled the pores, at the same time forcing out the sap in the timber. The timber to be treated by this process must be as fresh as possible. In order to construct the pressure chamber at the end of the pole, Boucherie used a wooden plate, wound a hempen rope around plate and pole and then drew the two tightly together by means of bolts and screws. In the first period of his discovery Boucherie also impregnated the living tree in the woods. The tree was tapped at the base and the copper sulphate solution forced in, which then followed the sap in its path through the tree and saturated all the pores with the solution. Boucherie dropped this practice very soon, however, and applied his process only on the felled tree, which he laid down inclined, having the copper sulphate solution enter at the base of the tree and emerge at the top. At the upper end there emerges first only pure tree sap, which is gradually mixed with copper sulphate until finally only copper sulphate runs out at the end. If the emerging liquid had the same density as the entering liquid the process was considered as complete. This took anywhere from 48 to 100 hours with ties and a much longer time with poles. Timber felled in winter is more easily impregnated than that felled in summer. The water used for the copper sulphate solution must have no calcium bicarbonate and no iron compounds and must be fairly free of organic compounds. As much of the copper sulphate is dissolved in the water until the Beaumé apparatus shows 1.5° Be. which is equal to 1.5 per cent $CuSO_4$ in the water. This mixture is then pumped from the mixing tanks into the saturating tanks which are usually placed in sets of two on top of a scaffold some 30 to 40 feet from the ground. The outflow pipes from these tanks are provided with fine mesh screens to prevent impurities from entering the poles. The main feed pipe ends in a number of smaller copper pipes, which end in the caps mentioned before and fitting into the ends of the poles or ties. If the Boucherie process should not lead to sufficient saturation when used at one end only, it can be applied at both ends simultaneously. Tests have shown that 1 cbm. (35 cubic feet) oak takes up about 25 kg. (55 lb.) copper sulphate solution; fir takes 125 lb. for the same quantity of wood and beech even 209 lb. The life of a pole treated with copper sulphate solution is usually figured at about 14 years. To protect the poles still further they are coated at the lower end with a coating of tar. Up to the end of 1909 European telephone and telegraph departments had about 83 per cent of the Boucherie treated poles. The time for treatment of a telephone pole ranges from 9 to 13 days. Wood treated with copper sulphate is tough and will always be more or less subject to the attack of fungi. If poles treated with copper sulphate are brought in contact with iron, which is easily done in any kind of pole where parts are fastened by iron screws and bolts the copper sulphate is decomposed into iron sulphate and copper or: $CuSO_4 + Fe = FeSO_4 + Cu$. At this spot in the pole the value of the impregnation liquid is consequently equivalent to zero. The Boucherie process has been improved by Pfister, who pressed the solution into the pole by means of a pressure pump, thus speeding up the process and reducing the time for impregnation per pole considerably.

Still lower in antiseptic effect than the copper sulphate process is that of the zinc chloride used by the Burnett process. The only advantage of this method is that of cheapness. Its low antiseptic effect is accompanied by other disadvantages. The zinc chloride is easily dissolved in water and can therefore be washed out of the tree with great ease. The impregnating liquid is made in the plants from zinc scrap and zinc wastes picked up and bought up everywhere. Usually the solu-

tion is 1 part zinc chloride to 59 parts of water. It has been found through practice that it is useless to employ stronger solutions, as the antiseptic effect is none the better. The zinc chloride solution must never have an acid reaction nor must it contain iron salts and should be clear. The proper density is that of 3° Be. at 17.5° C. temperature. Burnett was granted a patent for this process as far back as 1838, at the time employing a ratio of 1 part zinc chloride to 45 parts of water. This saturation process did not work in practice, however. Burnett then attempted to remove the sap from the timber by steaming, and then removing the sap with the air pump. The steaming brought the albuminous matter in the sap to the liquid stage and then the zinc chloride solution was pressed into the empty pores of the wood. This same high pressure process had been employed 7 years previously, in the year 1831, by the Frenchman Bréant, to obtain a satisfactory saturation of the timber. The timber to be treated is here brought into large iron tanks, each about 40 feet long with a diameter of 8 to 10 feet. When the ties or poles are in the tanks the doors are closed and the pressure increased to 3 or 4 atmospheres. The steaming temperature is 100° C. within one-half hour after the poles are in the tanks. The boilers are opened from time to time to allow the air as also the outflowing tree sap to escape. Every boiler is provided with safety valves, water and air cocks as also with the necessary pipes for admission of steam, air, etc. The timber is rolled into the tanks on railroad cars which run on industrial tracks. The head of the boiler is removed and attached by means of a small lifting crane. After as high a vacuum as desired has been produced, the zinc chloride solution is forced into the boiler. This solution has been preheated to 65° C. and runs from the mixing tank into the saturation tank, in which the mercury column is about 523 mm. It depends on the nature of the wood and the size of the poles or ties how long the process takes. After saturation the timber is seasoned out in the open air for 6 to 12 weeks. The life of poles treated in this manner is said to be from 15 to 19 years. The zinc chloride solution which is used has a syrupy appearance and must be free from iron compounds. The poles treated with this solution can stand a coating of oil paint which is not the case in the other two processes. Also there is no chemical decomposition if the zinc chloride comes in contact with iron bolts or other iron parts. This process has been improved by Wiese in Hamburg, who uses instead of zinc chloride a beta-naphthaline-zinc sulphate which is more resistant to the cold in winter than the zinc chloride.

The same basis for the removal of the sap in the wood and the liquefaction of the albuminous portions of the wood is shown in the Bethel process, only that here creosote oils are used and that the sap is dried out through long kiln drying. Bethel obtained his patent in 1840. The antiseptic power of the creosote oils was known ages past but the application was possible only after the oils could be obtained very cheaply as a by-product in the manufacture of coal gas. The heavy tar oil surpasses both the sublimate and the copper sulphate in its antiseptic qualities. The oil used for impregnation is a mixture of various oils distilling at 200° to 400° C., volatilizing with great difficulty and hardly possible to wash out by continued moisture. The principal carrier of the wood preserving qualities are the neutral constituents of the tar oil, which have a very high boiling point, and not the so-called tar acids, the phenol, cresol, etc. For wood impregnation, only those oils are used which do not evaporate or volatilize at ordinary or higher temperatures. The trouble with the tar oil impregnation method has been the large quantity of oil needed for efficient impregnation. It was therefore essential to find a process which would permit the saturation of the cell walls in the timber which are exposed to rotting and not fill the pores themselves or the cell chambers themselves, which ate up all the oil. This process in its improved form is the Rüping process. The Rüping process does not empty the cells of all contents and of all air but fills them with air under pressure. Then a still higher pressure is used and the cell walls filled with the tar oil till no more can be forced in. This guarantees that all of the sections of the timber are thoroughly saturated with the oil.

Then the excess oil is pumped out of the cylinders and the timber exposed to a vacuum. After removal of the vacuum the process is completed. The compressed air is intended to remove the oil which has not been absorbed by the cell walls in the timber. This work is furthered still more by the subsequent vacuum. The Rüping process was the starting point of a large number of other economy processes, none of which meet requirements as well as this one. Through the use of very high pressure the oil is forced into the cell walls only and not into the cell chambers as well, which is not necessary, as these are not exposed to destructive attacks. The strength of the timber is also increased by about 30 per cent. About a million telephone poles are impregnated each year by this process. The question has often been

TABLE I.—TABLE OF DETAILS OF PROCESSES.

Designation of Preservation Process	Impregnation Liquid per cbm (35 cu. ft.) wood	Cost per 35 cu. ft. in cent.	Detail Processes
1. Saturation fir or pine with mixed fluid.	1 pt. zinc chloride of 1.549 sp. gr. 40 pts. by vol. of water 2.6 pts. by vol. tar oil 600-800 lbs.	$1.25-$2.00	a Straining at 112° C. ½-1 hr. b Vacuum of 60 cm. mercury column 1½ hrs. c Pressing warm fluid at 70° C. at 6-15 At. pressure in timber for 1¼ hrs.
2. Simple Rüping process.	Pure tar oil 130 lbs. for pine 100 lbs. for oak	$1.50-$2.25	a Air pressure of 1.5-5 At. 5-30 min. to fill cells with air. b Admission and heating of tar oil to 70-100° C. and pressure of 5½-10 At. for pine ½ hr.; for oak 3 hrs.
3. Double Rüping process for beech.	Pure tar oil 225 lbs.	$3.00-$4.00	a Like No. 2, high pressure 1 hr.; vacuum ½ hr. Then repetition of process air pressure at least 2½ At. for 15 min. and oil at 95° C. Oil pressure 7 At. for 3 hrs.
4. Full saturation with pure tar oil	Pure tar oil Beech, 825 lbs. Pine, 800 lbs. Oak, 175 lbs.	$5.25-$6.20 $5.00-$6.00 $1.75-$2.25	a Vacuum 60 cm. mercury column for 10 min. b Partial filling of tank w. oil, heating oil to 105° which withdraws water from wood. Reducing water vapor 1-5 hrs. c Vacuum of 50 cm. mercury. d Full tank with tar oil and subsequent pressure of 5-8 At. for ½-1 hr. for beech and pine and 1-3 hrs. for oak.
5. Tar oil process with limited use of tar oil.	Pure tar oil 135 lbs.	$1.50-$2.25	a Heating the tar oil to 100° C. b Oil pressure of 2.5 At. for 15 min.; then cutting off supply. c Repeated treatment with hot air at 50° and 1.5 At. for 15 min. at 5 min. interval to drive off excess oil.

raised whether natural oils or petroleums could not be used for the impregnation process. Long tests and experiments have led to the following conclusions: 1. The neutral constituents of petroleum have no wood preserving characteristics. 2. by distillation and treatment with sulphur they can be given a high antiseptic power. 3. The anthracene oil, which consists almost entirely of neutral and high boiling constituents is superior to the impregnating oil rich in acid constituents. 4. The antiseptic power of the oil distilled with additions of sulphur is less by 15 or 20 per cent than that of anthracene oil. In general it seems then that natural oils could be used for impregnation of timbers. Table I gives various impregnation processes with the quantities used and also the time necessary for each process.

For a long time the antiseptic effect of the salts of hydrofluoric acid were known, especially the bacteria killing action of the alkaline salts as also of the zinc salt with fluorine. In order to find out the real effect of any process it is necessary to have statistics on hand, which will give an adequate idea of the life of the poles treated by the different processes. The German Imperial Telegraph and Telephone Department had started a statistical study of the life of telephone and telegraph poles as far back as 1852 and has expanded this study with each year. The department has a method of working, whereby the poles are obtained in the natural state from the various timber growths are then treated by the different process in their own plants and then studied each year by the engineers of the department. Most of the poles are treated with copper sulphate. Since 1900 a large number of poles have been also sent out to private Kyanization plants for treatment by that method. For practical reasons, the department prefers the copper sulphate treatment, as the following shows:

	End of Year 1903 *Per Cent*	*End of Year* 1910 *Per Cent*
Copper sulphate	83.0	89.9
Zinc chloride	0.2	0.4
Tar oils	4.4	3.0
Mercuric chloride	11.9	5.5
Other processes	0.1	0.1
Untreated poles	0.4	1.1

The total number of the poles observed in the more than 60 years of labor by the bureau is over six and one-half million poles. This is a sufficiently large number of poles to permit conclusions as to the value of certain preservation processes and the life of the poles. The life of untreated poles is about four to five years; that of poles treated with copper sulphate is ten to fourteen years; zinc chloride gives eight to twelve years; tar oils fifteen to twenty years; mercuric chloride nine to ten years. This was the report of an engineer in the year 1890. In the year 1904 the imperial department had observed more than 4,600,000 poles and thought it possible to draw certain conclusions from these observations. According to these later reports the life of poles is as follows:

Untreated poles	7.7 years
Copper sulphate	11.7 years
Zinc chloride	11.9 years
Tar oils	20.6 years
Mercuric chloride	13.7 years

The final report made at the end of the year 1909 in 1910 has changed these figures to some extent, as follows:

Untreated poles last	7.9 years
Copper sulphate	13.4 years
Zinc chloride	12.2 years
Tar oils	22.3 years
Mercuric chloride	14.5 years
Other processes	6.0 years

The superiority of the tar oil processes is clear in all cases, followed by the copper sulphate process, which is about equal in rank with the corrosive sublimate treatment. Of course it must be remembered that these statistics go back to days when the impregnation industry was still in its childhood and there is no question but that the life of poles in the present era of pole treatment practice is much higher than that given above.

That the wood preservation industry has not reached its final point as yet is proved by the numerous new patents that are issued and new processes that are offered each year. Thus Heise improves the tar oil process by subjecting the pole to the action of another liquid under pressure after the tar oil has saturated the pole. He uses superheated steam for his treatment. In order to distribute the impregnation liquid uniformly through the timber, Rütgers uses hot air under pressure after the poles have been treated with the tar oils.

TABLE II.—TABLE OF STRENGTHS.

Lbs. Sq. In.	Tensile Strength	Compressive Strength	Bending Strength	Shearing stress at right angles to fibre
Fir	1420-16910	4260-4970	6177	3834
Spruce	10508-12212	4260-6390	6106	3621
Pine	1988-18176	4260-4686	4686	3010
Larch	7810-8378	7668-8236	11928	3479
Red Beech	1562-21300	5396	8940	5623
Oak	2840-20590	5254	8804	6099
Ash	7100-9940	....	9940	....

TABLE III.—SHOWING LIFE OF POLES.

From 1852 to 1904 were exchanged.

Type of Process.	End of 1903 there stood poles Nos.	Account rotting Nos.	Other causes No.	Together Nos.	Total No. of poles observed to 1904. Nos.
Copper sulphate	2,560,412	663,069	536,955	1,200,024	3,760,436
Zinc chloride	11,689	172,822	33,388	206,210	217,899
Tar oil	86,818	83,630	92,049	175,679	262,497
Mercuric chloride	156,818	113,577	23,516	137,093	293,911
Other processes	2,108	.....	.....	.....	2,108
Untreated	30,895	76,813	15,257	92,070	122,965
Together	2,848,740	1,109,911	701,165	1,811,076	4,659,816

From 1904 to 1910 were exchanged.

	End of 1909 there stood poles, Nos.	Account of rotting Nos	Other causes, Nos.	Together, Nos.	Total No. of poles observed to 1910, Nos.
Copper sulphate	3,305,802	315,168	339,788	654,956	3,960,758
Zinc chloride	7,286	4,846	2,890	7,736	15,022
Tar oil	177,483	13,313	17,049	30,362	207,845
Mercuric chloride	474,399	14,512	29,921	44,433	518,832
Other processes	2,462	496	255	751	3,213
Untreated	14,892	24,657	3,367	28,024	42,916
Together	3,982,324	372,992	393,270	766,262	4,748,586
From 1852 to 1910 there were exchanged poles		1,109,911	701,165	1,811,076	1,811,076
Number of poles studied to the year 1910		1,482,903	1,094,435	2,577,338	6,559,662

Polifka treats the timber with a mixture of 40 to 70 per cent creosoted wood tar oil and a heavy natural oil destillate of high boiling point. Instead of the wood tar oil the cheaper ordinary coal tar oil has been used, mixed with a certain percentage of carbolic acid. The natural or mineral oil destillate serves as solvent for the creosote oil and is therefore present in larger quantities than the antiseptic agent. The oil mixture has a boiling point of 100° C. and is mobile at ordinary temperatures. Another treatment is that of Höntsch & Co. who use acetylene gas in acetone oil. They saturate the timber first with a solution of rosin in acetone oil, about 30 per cent rosin and then add the hot acetone oil with acetylene gas

mixed in. Here also pressure is used and owing to the expansion of the gas in the cells a part of the impregnation liquid emerges again from the pole. The solution is forced in at a pressure of 4 At. being 1 liter acetone oil to 100 liter gas. A part of the acetylene remains permanently in the wood, as it is held back by the solvent. Other treatments have been proposed, none, however, seem to be able to come up to the more expensive, but very effective treatment with tar oils.—*Telegr. u. Fernsprech Technik.*

Utah County to Control Rates

By an ordinance enacted, effective May 12, the board of county commissioners of Salt Lake county, Utah, will in the future have authority to regulate service rates of telephone companies operating under county franchises outside incorporated towns.

Enactment of the ordinance was first considered at the time of the beginning of the fight between the Mountain States Telephone and Telegraph Company and its county patrons.

Authority is given the county commissioners, under the ordinance, to fix reasonable rates to be charged by any telephone company operating in the county and to determine and compel reasonable service. Violations of any rules or orders of the board of county commissioners, under the ordinance as enacted, may be punished by a fine not to exceed $100 for each offense or imprisonment not to exceed ninety days for each offense. The ordinance provides that:

All charges shall be just and reasonable and every unjust or unreasonable charge made shall be prohibited and declared unlawful. Service, equipment and facilities shall be furnished by every telephone company to promote the safety, health, comfort and convenience of its patrons, employees and the public.

Every telephone company shall file with the board of county commissioners within sixty days a schedule of all rates, together with all rules and regulations pertaining to rates, all rules and regulations made by any telephone company to be just and fair.

Schedules of rates filed by any telephone company shall not be in excess of rates in effect on March 1, 1916, and nothing in the ordinance is to prevent the board of commissioners from approving or fixing the rates at any time in excess of or less than those shown by such submitted schedules.

No change shall be made in any schedule of rates or service classification, nor shall any rule or regulation be changed unless so ordered by the board of county commissioners. Every telephone company in the territory affected by the ordinance shall receive and transmit messages from other telephone companies with the lines of which connections may have been made or have been ordered by the board of county commissioners.

Upon finding that any rate is unjust or unfair, the board of county commissioners may determine a just and fair rate of service and the telephone company concerned shall observe such action of the board and operate in conformity therewith.

A Lesson in Government Ownership

It has been notorious that the government-owned telegraph systems throughout Europe have been operated at a deficit, says *Postal Telegraph*, and that these deficits have been made up by the taxpayers. Now that taxes, multiplied many times, are needed to pay war costs, the governments have been compelled to make the various government-owned utilities self-supporting, if that is possible. Great Britain was the first to realize the necessity by advancing telegraph rates 50 per cent, and in a report dated February 21, made by the committee appointed by the British government to look into the question of retrenchment in the public expenditure, the government-owned telegraphs is discussed as follows:

The history of the telegraphs is most unsatisfactory. They were taken over in 1870 at a cost (including capital expenditure on extensions) of £10,129,687 [£1=nearly $5.00 American money], in the anticipation that they would yield a profit to the state. After the second year of post office management the profit failed to cover interest on the capital outlay. Year by year the financial position has grown worse. In recent years the loss upon working has not been less than £1,000,000 a year, and this loss includes nothing for interest due to the state upon the aggregate losses of previous years. In the year 1911-12 the post office calculated the accumulated loss at £21,796,520, or double the amount of the original purchase money. We are informed that this unfavorable result is due to the considerable reductions of charges which have been made from time to time, sometimes with little or no regard to the prospects of maintaining a profit.

This, in a few words, sums up the failure of government ownership of the telegraphs in England, and is explanation sufficient why they have been compelled to raise their telegraph rates by 50 per cent. Now Germany has made a big increase in telegraph rates. The very latest report is that Australia will increase telegraph rates in order to avoid the repetition of a deficit of over $3,000,000. A government can no more give something for nothing than an individual can, and while deficits may be covered up by taxation the day of reckoning eventually arrives.

End of the Inter-State

The attorney-general of the United States has consented to the plan for the sale of the minority holdings of the securities of the Inter-State Telephone and Telegraph Company of Aurora to the Bell Telephone interests.

This is the last official indorsement necessary to the plan, the Illinois Public Utility Commission, and both parties to the sale having agreed to the terms of the deal. The plan assures some return to the minority of each was deposited by doubtful equity after the Bell interests got control of the Inter-State company.

The Bell company agrees to pay $4 a share for the stock, $46 for the bonds and $70 for the three-year 6 per cent equipment trust notes, providing 90 per cent of the outstanding minority of each was deposited by April, 1915. All but the required amount of stock was deposited and the company waived the requirement in that respect. As a result the minority interests will be paid $414,034 for 116 notes, 6,115 bonds and 7,136 shares of stock.

The Inter-State company operates many exchanges in Aurora, Batavia, Geneva, Elgin, Naperville, Plainfield, Joliet, Sterling, Peoria, Springfield and many other cities.

The Inter-State company has been a victim of many misfortunes, mismanagement in the early days, storm damage and fire damage, and yet many of its subscribers remained, because of the excellent service given by the Inter-State telephone operators, and its toll rates are less than those charged by the Bell company.

The native telephone exchange at Foochow, China, has 400 subscribers and does an annual business of about $10,000. The local company has made great improvement in the service extended during the year. The subscription for the ordinary wall instrument is $24 per annum, and for the mitrophone style $28.80. The subscription rate for either wall or desk telephone is the same. The company proposes to install all mitrophone instruments in the near future. There are two branch exchanges, six switchboards being in use—four of British and two of Norwegian manufacture.

Train Dispatching by Automatic Telephones

Abstract of a Paper Read Before the Brooklyn Engineers' Club

BY E. E. TRAFTON

IN common with a number of important railroad companies in the United States, the New York Municipal Railway has recently adopted the automatic telephone system of train dispatching, which has superseded the old method of telegraph, Bell telephone and magneto service. The system is installed by the Automatic Electric Company of Chicago.

The central station equipment is in the main office building, 85 Clinton street. Each of the way stations, of which there are thirty-two on the Eastern division and twenty-two on the Southern division, communicate with the chief dispatcher there by speaking into a transmitter, using the word "dispatcher" instead of the old "hello." No ringing is required as the dispatcher's circuit is so arranged that, if he is not listening on the line, the loud-speaking horn attached to the wall speaks out to him and he answers by plugging in and talking on a chest plate transmitter. While talking, the dispatcher depresses a foot switch, or if the message is a long one, he may depress the "talk-key" on the cabinet.

The dispatcher, to call the way stations, pushes a button on the cabinet in front of him representing the tower and a bell rings at that point and no other point. A slight click in the head receiver indicates to the dispatcher that the bell has rung. He can also ring one station while talking to another, and, by means of a special key on the cabinet, can automatically ring all stations on his circuit simultaneously to give a general order or standard time at noon. If the dispatcher should press the wrong button at any time, he can stop the call by pushing the mistake button.

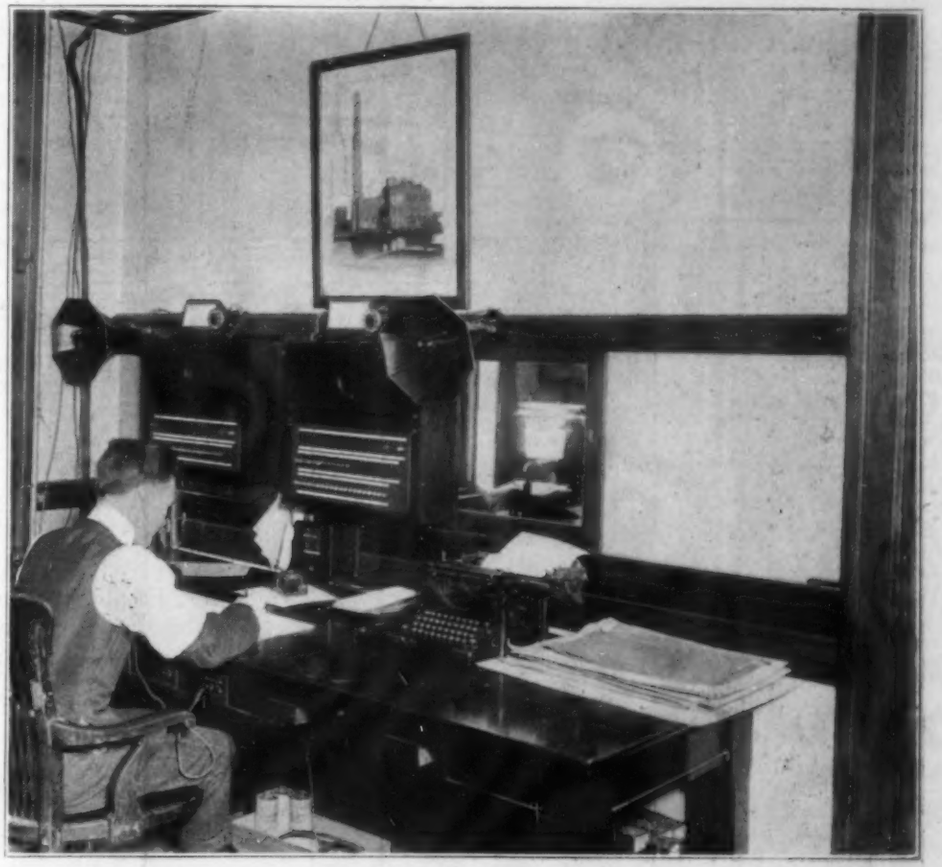
This system of communication between towers is entirely independent of switchboard operators, and the dispatcher in charge has the situation entirely under his control. All trains one minute or more late are reported to the dispatcher.

Getting instant advice of a late train then permits altering the scheduled time of other trains sufficiently to equalize the interval, thus benefiting the service.

The automatic telephone system is operated with 110 volts direct current. By means of the introduction into the line circuit of a special device, known as an amplifier, the loud-speaking horn causes no loss in transmission. This amplifier is similar to the De Forest telephone amplifier, which is used at four points in the line circuit between New York and San Francisco.

Another system designed for intercommunication where the party called is unable to leave his signal levers long enough to answer a telephone call, has been installed in the Center street loop towers and the Marcey avenue tower.

All of these, besides being closely related, are extremely busy in rush hours. This system makes it possible for a towerman to receive reports and have one hand free for his signal levers. All towers on this circuit hear what is said over the line and thus keep advised of the general conditions of traffic.



Central Station Automatic Telephone Dispatching System.

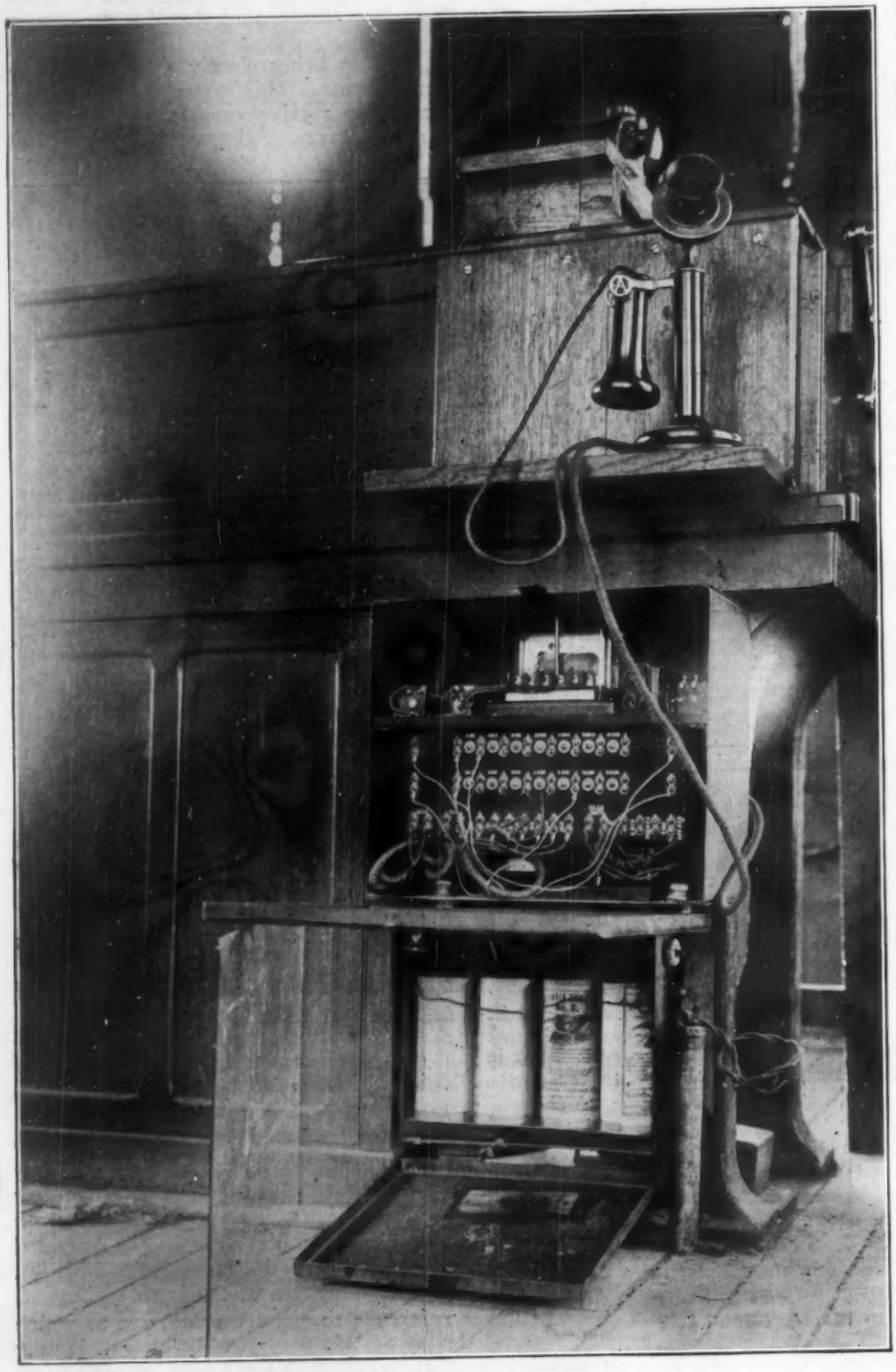
The apparatus and circuits are new and distinct advancements over earlier loud-speaking systems. When talking into this equipment, battery is put on the transmitter by pressing a button in the stand and the volume is considerable from each horn, even with ten or fifteen horns on the one line. An auxiliary receiver is provided in case of excessive disturbances from train whistles, when it may supplement the use of the horn.

In further reference to supplemental uses to which such a novel device as this may readily be put, it may be added that sometimes, in the quiet hours, various selec-

*Telephone engineer for the Brooklyn Rapid Transit Company. Illustrations by courtesy of Automatic Telephone, Chicago.

tions by local talent are the usual occurrence and these afford considerable amusement among our underground lever workers, if not to the operating officials, who frequently visit the towers which are equipped with a loud speaker.

A valuable feature of the B. R. T. telephone system is the placing of telephone terminal equipment in a special compartment, built to meet the company's requirements, in the subway station wall. Telephone terminal equipment was formerly placed in damp and dark manholes and was not easy of access.



One of the Stations on the Automatic Telephone Dispatching System.

A manhole for splicing and terminating cables is directly behind this special compartment.

The terminal equipment is separated from the high tension cables in the manhole by a reinforced concrete wall to prevent electric arcs from reaching it, and where four cables are exposed to arcing, they are wrapped with rope, spirally, and two layers of cement applied.

Of two tests which were made, in one the asbestos lining was punctured and cable ruined in 55 seconds by an arc of 800 amperes at 240 volts. But in the second test, the same arc across the same cable, protected by cement, was not even injured in 8 minutes.

This feature makes the chances of a disastrous subway fire very remote.

In addition to all possible endeavor to render equipment, tracks, signals, speed control and construction all safe and as nearly perfect as possible, special means for the instantaneous cutting off of high voltage current from the third rails and feeder cables is generally used for underground systems and as installed on the B. R. T. lines the following description and directions for the operation of the same are applicable:

For the purpose of killing the third rails in case of accident or emergency, there has been installed in the subway an emergency alarm system, consisting of alarm boxes, located at suitable intervals, which when pulled will disconnect the third rails from the source of power. These boxes are located, in general, one at the head of each station platform, and at suitable points between stations at locations approximately 1,000 feet apart.

The boxes between the stations are located on the curtain walls between the tracks, so as to make it unnecessary for trainmen to cross any tracks in order to reach the boxes. The locations of the boxes in the subway are, in most cases, indicated by blue lights inserted in the tunnel lighting circuits.

Opposite each box on the outside wall of the subway is located a telephone connected directly to the company's telephone central (Clinton street). The removing of the receiver from the hook signals central, no ringing is required.

As the pulling of any box will kill all tracks in that section, it is extremely important that the chief train dispatcher re-

ceive immediately a complete report of the trouble, so that power may be restored on the unaffected tracks as soon as possible.

Between adjacent third rail sections two boxes are installed side by side, controlling the third rails in each direction, and in case it is necessary to kill the rail on each side of the section insulator, both boxes must be pulled.

The following general rules are to be observed in connection with the emergency alarm system:

First, the appliances belonging to this system must not under any circumstances be tampered with, and must be used only in case of emergency, which makes it necessary for the preservation of life and property to kill the third rail. The telephones may be used, however, at all times.

Second, it shall be the duty of any employe of the company, observing the necessity of killing the third rails, to turn in an alarm.

Using the Automatic Telephone Dispatching Equipment in the Chambers Street Tower.

Third, proceed to the nearest alarm box (generally indicated by a blue light), open the door, grasp the lever and pull it down until it stops, and release. Do not repeat this operation unless the rails become alive. Close the door and immediately call up the chief train dispatcher on the telephone, giving name and position, also full report as to the nature and location of the trouble.

Fourth, immediately after receiving the report, the chief train dispatcher shall advise the chief operator of power stations as to the cause and location of the trouble.

Fifth, the chief train dispatcher shall notify the chief operator of power stations when power may be restored, and shall specify carefully which tracks are clear and ready for power.

Sixth, all employes connected with the movement of trains, maintenance of or repair of tracks, signals or power circuits, or engaged in any kind of work in the subway, must familiarize themselves with the location and use of emergency alarm boxes.

The Chamberlain Bill

In the Senate of the United States, on May 15, Mr. Chamberlain introduced the following bill, which was read twice and referred to the Committee on Interstate Commerce:

A bill to prohibit telephone companies and telegraph companies from engaging in the sale of merchandise.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that it shall be unlawful for any company, firm, or corporation directly or indirectly engaged in transmitting or conveying the human voice or messages by electric current from any state, territory, or the District of Columbia to any other state, territory, or the District of Columbia, or to any foreign country, to transmit or convey in such interstate or foreign commerce the human voice or any message by any electric current at the time that it may be, either directly or indirectly, engaged in the business of selling or trading in any articles or commodities.

SEC. 2. That any company, firm, or corporation subject to the provisions of this Act, or any director or officer thereof, or any receiver, trustee, lessee, agent, or person acting for or employed by such corporation, firm, or association, who shall willfully do or cause to be done, or shall willfully suffer or permit to be done, any act, matter, or thing in this Act prohibited or described to be unlawful, or who shall aid or abet therein, or shall cause or willfully suffer or permit any act, matter, or thing prohibited or declared to be unlawful by this Act, or shall aid or abet any such act, or shall be guilty of any infraction of this Act, or who shall aid or abet therein, shall be guilty of a misdemeanor, and shall, upon conviction therof in any district court of the United States within the jurisdiction of which any such offense was committed, be subject to a fine of not to exceed $5,000 for each offense, and such person shall, in addition to the fine hereinbefore provided, be liable to imprisonment in a penitentiary for not to exceed two years, or both such fine and imprisonment, within the discretion of the court.

SEC. 3. That each sale of or trade in any article or commodity made by any company, firm, or corporation subject to the provisions of this Act shall constitute an offense in violation of the provisions of this Act.

The relations of the Bell operating telephone companies with the Western Electric Company are obviously contemplated in this bill.

Telephones on Approval

Telephones on approval is the latest wrinkle in the Flathead country of Montana.

The Independent Telephone Company desires to extend its rural service through the lower end of the valley to connect with St. Ignatius, and later with Ronan, Dixon and Ravalli. Money is needed to finance the construction, and instead of selling stock, President Stevens has decided to install telephones at all homes along the line.

After ten days' use, if the subscriber is pleased with the service and desires to continue it, he will be asked to pay a year's rental, $20, in advance.

Experiences with a Farmers' Line

Editors Telephone Engineer:—Some four years ago a strictly co-operative telephone company was started, some 23 farmer neighbors joined together and bought some fifteen miles of line with about 20 telephones installed and in service. It cost us, I think, about $900. We have since added to this line till now we have over 20 miles of line and over 300 telephones installed. Our plan was to have each subscriber own one share of stock and his own telephone. If we rented telephones then the company would be obliged to keep them in repair, while now each individual keeps up his own telephone, supplying his own batteries as needed. When a break occurs on the line the one nearest whose home the break occurs splices the line temporarily; when enough breaks occur so it interferes with good service we then send a man out over the line to put it in shape at the company's expense.

In constructing the line we were careful to place wires on enough poles to protect the poles from lightning, but owing to the ground drying below the depth of the pole upon which the protecting wire was placed, we have had some five poles in all I think damaged by lightning in the four years our company has been running. Another good thing we did to protect our telephones from damage by lightning was to place a copper wire on the ground wire (our line is a ground circuit single wire line) and bring this copper wire to within one-sixteenth of an inch of the incoming wire; this enabled all overcharge of electricity to jump from the incoming wire to the ground wire and in that way protected our telephones from burning out. It also protects the user of the line during a storm from getting shocked. Electricity seeking the earth had less resistance in jumping the one-sixteenth of an inch resistance than the resistance the telephone offered. The benefit of this has been, that we have not had any lightning damages to telephones to repair. We use the common small mica lightning arrester also on each telephone.

Up to this time it has not cost us 50 cents per telephone all told for the general upkeep of our line. When we planned to take over this line and run it ourselves we were told we could not keep up our line for fifteen dollars per telephone per year. This wise information was given too late; we had young farmer boys on our line who had helped build telephone lines and were wide awake enough to learn something of the cost of building telephone lines and maintaining them.

The question arose as to whether we would have "rubbering" on the line. Fortunately it was decided to permit rubbering, each one to respect others' right to use the line for business purposes. Anyone was welcome to chat over line at any time. It was soon found that "rubbering" exhausted the batteries, so a switch was placed upon each telephone at a cost of fifteen cents each; in this way batteries were protected while rubbering. We also found difficulty in ringing when a few receivers were down. This we overcome by placing resistance coils on each telephone at a cost of $1 each. We use 2.500 ohm telephones; this enables us to have about forty upon one line if necessary. We concluded this would be cheaper than stretching another line to keep from overloading.

We have had difficulty with the tax commissioners in finding out what our four per cent gross income tax would be. We had no income or outlay; it took about six months of correspondence to get square on the tax book, costing us $1.50 for three years. This was made out by counting additional members as they each took a share of stock, $35. The only other trouble we have had is members selling their farms and moving away. Farms have gone into the hands of land agents who have failed to find permanent purchasers immediately; this has kept a share or two out of use for a time.

We find that the payment of $35 per share is too low to permit a line to be extended very far. The Eddsville Telephone Company organized a little after we did and held its shares at $50 per share. That amount is sufficient to extend lines as far as they wish to go to have an efficient line. No one has a salary, and the money paid out for repairing the line is extremely small. The question is raised as to what we will do if we have no fund for depreciation. Our answer is when our line needs rebuilding we will reach down into our "jeans" and pull out our "weasel skin" purse and put up the repair money just as we did when we started. There is no worry about our sinking fund being misappropriated; we each have just as much confidence in each other putting up what is needed when the time comes as we would have confidence that a bank would be ready to put up our sinking fund if we had been fools enough to assess ourselves and put our money in the bank at three or four per cent and let the banks loan the same money to our neighbors at ten per cent. We have neighbors who have paid out as telephone rent since we have organized over $45 for no better service than we are getting at a cost of $3 per year, that we pay for connecting with N. W. line; these same neighbors were afraid to join our co-operative telephone company, because they were told farmers can never make a success of their co-operative efforts and still most farmers dislike to be called fools or "suckers," although it is said one is born every minute.—H. V. P.

Imperfect Dielectrics and Radio Antenna

The loss of electrical energy in an antenna is caused by the resistance of the antenna. The so-called radiation resistance is a measure of the portion of the energy usefully dissipated in the emission of electromagnetic waves. The remainder of the resistance causes a useless dissipation of energy that should be reduced to a minimum.

It has been previously noted that, in the region of the longer wave-lengths, the resistance of an antenna increases with increasing wave-length and the explanation has been offered that this is caused by dielectric absorption or a loss of energy such as that which takes place in a poor condenser and that it is probably caused by the ground. However, the Bureau of Standards, Department of Commerce, finds that the loss does not take place in the ground but in poor dielectrics in the electric field of the antenna such as wooden masts, trees, insulation, etc. Running the leads into a building may increase the resistance unless the interior walls are covered with metal screen and connected to ground. It is important, therefore, to reduce to a minimum these sources of energy loss in designing an antenna.

The report on this subject is Scientific Paper No. 269, entitled "Effect of Imperfect Dielectrics in the Field of a Radiotelegraphic Antenna," and copies may be procured, gratis, upon application to the Bureau of Standards, Washington, D. C.

Illinois Naval Station in Wireless Tests

Waukegan, Ill., through the naval station, is playing an important role in testing the wireless telephone now being perfected under the supervision of naval engineers, and frequent tests of the wireless at the Great Lakes training station are being made.

Recently one of the wireless telephone operators was called up by Admiral Benson from Washington, who talked with the local sailor lad for several minutes. Word from the naval station is that the operator reported that he could hear Admiral Benson much more distinctly than he has some who have called him on the wire from Chicago, and that the conversation with the naval chief at Arlington was as clear as though the latter was speaking from Waukegan.

The wireless telegraph at the training station recently made another record. It picked up a message from Yokohama. The Japanese station is more than 7,000 miles away, and the message thus recorded was at the time declared one of the very first received at such a distance.

In order to keep the lines free for official messages on the occurrence of air raids, the postmaster-general of Great Britain has issued an appeal to the public to use the telephone as little as possible on such occasions, and on no account to call up the police or other public officials.

OKLAHOMA TELEPHONE NEWS

MONTHLY BULLETIN OF THE OKLAHOMA INDEPENDENT TELEPHONE ASSOCIATION

EDITED BY H. W. HUBENTHAL, SECRETARY, AFTON, OKLA.

WE are pleased to be able to report that we have taken in eleven new members since our convention in March. It appears that telephone people are taking a lively interest in our new organization. Almost daily I am having inquiries from some manager or owner of Independent telephone companies, not only by letter, but also over the telephone, as to the aims and objects of our association, and as to the qualifications of companies to become members. For the benefit of those who are interested or would like to become members of our association, I wish to say we have only one class of members, namely, active members. Active members must be bona fide operating or manufacturing telephone companies, independent of and not owned or controlled by the American Telephone and Telegraph Company or any of its associated or allied companies, and in the event any such interests or control shall be acquired by the A. T. and T. Co. or any of its allied companies or any persons acting for them, directly or indirectly such memberships so affected shall cease. Members should interview eligible neighboring companies with the object of enlisting them for the good of the cause. The yearly dues of the association are $2, and the association is in position to furnish any of the leading telephone magazines to its members at reduced rates, also to new members. Write the secretary for particulars.

GROVE FARMERS' RATE CASE.

In our last issue of the *Bulletin* mention was made that this case was pending in the Supreme Court. Since that time the commission remanded its decision and another hearing was had on the case May 9. In the new hearing we have made an even more favorable showing than in the previous hearing, that we are entitled to 50 cents per month per subscriber instead of 25 cents for farmer switching service. All companies will watch with interest the outcome of this case.

TOLL COMMISSIONS.

Owing to the numerous inquiries received by me on the subject of toll commissions, I want to say that in working up the data for something like twenty-five or thirty companies, and a number of other companies whose cases are now pending, my experience has shown me and I am fully satisfied that any companies receiving less than 25 per cent commissions on an average on in and out toll business are not receiving the full compensation for handling the toll business for other companies, and are simply sleeping on their rights; and as it is not a difficult matter to make a proper showing that they are entitled to this, I will only be too glad to furnish the information as to ways and means how to accomplish this to members who will apply.

ROUTING OF TOLL MESSAGES.

On June 13 there will be a very important hearing before the Corporation Commission at Oklahoma City as to the right of a company owning toll lines to route messages over its own toll lines as initial lines in the transmission of messages through connections with other toll lines. That is, when a company owns a toll line in the direction of the delivering point of the message, the company should have the right to route the message as far as it can over its own lines and take a line haul in the revenue from the message. The complaint is by the United Telephone Company of Afton vs. the Pioneer Telephone and Telegraph Company. The Jennings Telephone Company of Jennings, Okla., has a similar complaint on a division of line haul. Already a precedent has been established in this state giving the exchange or company originating the call the right to route the business. This was in the cases of the Comanche Telephone Company and the Rush Springs Telephone Company vs. the Pioneer. I will urge all members and owners of toll lines and those contemplating building toll lines to be present at this hearing. That date will also prove to be a very opportune time to have a directors' meeting, to be attended by as many of the members as possible, to discuss the following subjects:

First: The connecting of, and joint service between, neighboring Independent toll lines with the object of eventually connecting all Independent companies throughout the state by means of Independent toll lines.

Second: To arrange for proper traffic regulation covering such service, and as to the advisability of enlisting the services of large wire companies to handle long-haul business.

Third: Whether or not you now have a fair and equitable working arrangement, and if you are receiving a proper line haul, and full compensation for the handling of inter-company business.

SEMI-ANNUAL MEETING.

It has been suggested by some of our members that we have our meetings semi-annually. I believe this to be a good suggestion and I would like to have an expression from all the members, first, as to the advisability of holding these meetings, and further, as to the time or dates they should be held. This will enable me to arrange a suitable program, representation by Independent manufacturers, and also that the time of our meetings does not conflict with meetings of other associations.

Judging from articles of agitation in leading telephone periodicals, I am led to believe it is to the best interests of the Independent companies to buy equipment only from Independent manufacturers. I am going to have more to say on this subject in later bulletins.

I am somewhat surprised to note the opposition on the part of telephone companies in other states to public utilities commisisons. We of Oklahoma, speaking for those of the telephone companies having had experience with the Corporation Commission of this state, certainly are in favor of commisisons. Of course conditions may be different elsewhere, but in my opinion, in this state the Public Utilities Commisison, or as it is called, the Corporation Commission, has not only been of benefit to the public at large, but also to the telephone companies.

Again I want to remind members to favor me with items of news for publication in the *Bulletin*, to reach me not later than the 15th of each month.

(News of the Oklahoma Independent Telephone Association will be presented in these pages every month, for the convenience of members and of other state associations interested in the welfare of the new organization. The officers of the Oklahoma association are C. E. Devin, Apache, president; Troy A. Simpkins, Mountain Park, vice-president; H. W. Hubenthal, Afton, secretary-treasurer; E. C. Patton, Oklahoma City, general attorney; and A. Gordon, Magnum; George Massey, Watonga; M. M. Flickinger, Kingfisher; George Holt, Quinton; and E. D. Simpkins, Mill Creek, directors.)

Farmers' Mutual Telephones

In the *Ohio Farmer* is an editorial on the subject of farmers' mutual telephones, calling attention to the fact that the public utilities law is causing considerable inconvenience and, perhaps, working some injustice to rural telephone companies. Quite a number of letters have been received by the paper, which indicate that there is room for considerable adjusting in order to promote good telephone service among Ohio farmers. Below we quote some statements from some of these letters, greatly condensed:

We have telephone troubles galore in Morrow, Delaware and Marion counties. Over two years ago I was successful in organizing three mutual companies in Morrow County, of which all proceeded to build lines and connect with each other so as to get service over the county. We were all stopped by a restraining order and have spent two years in the courts, with the decision at last against us. The people in general are amazed at such a decision. According to the recent supreme court decision farmers can not set poles and string wires on their own land for their own use. Farmers should retain the right to build and operate their own telephones without having to secure the permission of any state body.—I. T., Marengo, O.

We live near the line between Brown and Adams counties. We greatly desire a telephone. We are only one mile from pike, along which one company has its lines strung. All of our friends use the other telephone and we would like to have the same one, but we are told the recent law prevents two different lines running parallel with each other. We are deprived of the right to get the service that we want.—H. A. G., Macon, O.

As the courts interpret the law in this county, I have no right to place a telephone line from one house to another on my own farm without going before the utilities commission and showing some cause why the existing corporation owned 'phones are not to be used. The people of this community formed a mutual telephone company, to be run without profit to any one, but the established company got an injunction and carried the case to the supreme court, which sustained the injunction. I think that co-operative telephone companies should be exempted from the public utilities law.—R. T. K., Mt. Gilead, O.

In 1911, on account of poor service, advanced rates, and the refusal of the existing company to sell its franchise, a mutual telephone company was organized, not for profit. The local company brought action against us in common pleas court of appeals and before the State Utilities Commission, but in each instance it was agreed that the utilities law did not provide jurisdiction over a corporation not for profit. In 1912 our lines were put up and for two years we operated without long distance connections. Last summer we built a line to another mutual company, but before the lines were connected the local company served an injunction to stop our company entirely. This injunction was made perpetual by one of our county judges. We do not understand what right a firm has, under the federal law, to close a competing, legitimate business, whether for profit or not. We do not understand how a judge can hear or decide a case in court if he is personally interested in one side and must have had his opinion in advance of the hearing.—M. U., New Washington, O.

Last fall the telephone company at Ashland published a statement that the utilities commission authorized them to raise their rates from $1 to $1.35 on rural telephones. The rural patrons remembered that they had helped to establish the lines by hauling poles, in many instances furnishing and setting the poles free of charge, with the understanding that they were to have their service for $12 per year, and that not more than ten parties were to be put on one line. At the time many lines carried more than ten parties and the service was not satisfactory, so they refused to pay the increased charge. Many telephones were removed. Thereupon the rural patrons organized a mutual company, not for profit, but have been refused the right to build a line for their own use. We shall be glad to co-operate with any or all organizations in demanding with them our rights. The utilities commission denies authorizing the company to raise the rates but gives us no encouragement in building a line.—T. R. P., Ashland, O.

We started our mutual telephone company under the Ohio charter June 8, 1913, securing 139 signatures. We bought poles and other materials and set 21 miles of poles and strung 34 miles of wire, the material costing us $3,500. Then we were enjoined from proceeding further. Our lines touch two small hamlets and all patrons are farmers along whose property the lines run. We are compelled to keep the brush and weeds cut along these roads but are enjoined from setting poles and stringing wires because the old companies have their lines along the roads. There are 137 of us who would like to know what we can do. J. B. R., Galion, O.

We think it is an outrage to be held up by the courts of Ohio and prevented from building mutual telephone lines not for profit. We have been enjoined and held up by judges who, while deciding our cases, were actual owners of stock in the old line companies. We believe that the public utilities act should be amended so as to exempt all mutual telephone companies not for profit. We and all liberty loving citizens of the state will appreciate any publicity you can give the matter. We have three companies in this county that are tied up with injunctions, with from $6,000 to $8,000 worth of materials on hand.—J. D. E., Cardington, O.

Your editorial on co-operative telephones was read in our Grange meeting and I was instructed to state our case to you. Up to last September we were charged $1 per month for service. At that time the price was raised to $1.50 for rural patrons and $1.25 for town patrons. We petitioned that the price be the same for all but no attention was paid to the same. Out of 90 subscribers 67 surrendered their telephones. The telephone manager is reported as saying that he has the town wired and we cannot help ourselves. Is it true that we have no recourse? Should our petition have been sent to the Utilities Commission?—K. S. F., Monroe Center, O.

A few years ago Wisconsin enacted a group of utility laws that insured to the people the right to serve themselves. Organized utility companies were alarmed and proceeded to write the utility laws of every state in which their power was paramount. Unhappily Ohio is one of these. Under our utility law no telephone company can be organized and do business in a territory already occupied in whole or in part by another company without first applying to the state utility board. Over 300 mutual companies have been organized in our state under the ruling and belief that they were not subject to the utility board, if organized not for profit. But a decision of the Ohio supreme court last fall makes them subject to the board and there seems to be no relief in sight. Why should a neighborhood or community of farmers be compelled to accept any kind of service at any kind of price that a privately owned company may establish? The Ohio State Grange took steps at the last meeting looking to relief along this line, and a state organization of mutual telephone companies has recently taken action toward invoking the initiative and putting the matter before the people of the state. This law does not as yet apply to companies established before the law was passed, but it seems certain that its scope will soon be extended to take in all so as to prevent the people from serving themselves. Farmers of Ohio, what do you think about it?—H. S. L., Celina, O.

Here we have statements from several sections of the state, and there can be little doubt that the telephone situation is unsatisfactory to the farmers.

On to Havana!

After the completion of the long line to Key West, Fla., the next step in long distance telephone development will be a submarine cable from Key West connecting Havana, Cuba, with the Bell system in the United States, according to the *Southern Telephone News*, a Bell house organ.

This announcement was made by N. C. Kingsbury, vice-president of the American Telephone & Telegraph Company.

Havana and Key West have both seemed isolated and far away on account of the lack of telephone connection with the rest of the world. In a few months they will be within reach of our voices, and although the actual distance will be the same, they will be more like our next door neighbors than would otherwise be possible.

Insincere Tactics

The Struggle of Monopoly to Perpetuate Itself in the Telephone Industry

TERRY W. ALLEN

NO government rests upon the written constitution that is supposed to be the foundation of a democratic form of government. A government rests upon the interpretations of the men who have the power of interpreting the constitution and a government is to be judged by the men that compose this constitutional interpreting body; and it is so in the business world also.

A business is not judged by the paper value of its stock, or by the promises that it puts in writing; but it is judged by the intentions, by the ideals, by the principles of the men who guide that business.

Any great business enterprise must have fundamentally, three things to make it a success: First it must have honor and integrity; second, it must have efficiency, and third, it must have producing power. In other words, for a business ultimately to be a success, it must be honest in its dealings, it must be efficient in its management and it must have a producing power that will render it stable. Without these three principles, a business is likely to run upon the rocks of public conscience and be judged by its acts.

The American Telephone & Telegraph Company is a big and cumbersome business; and it seems to lack some of the principles above named.

In the first place the American Telephone & Telegraph Company volunteered to do a certain and reasonably intelligent thing, when it found that the government's prosecution was likely to interfere materially with its business. It promised to live with and not destroy competition. In other words, it came out openly and said that competition as a force in economics was proper and right; and that as competition had a right to exist, it would not jeopardize competitive conditions but would try to harmonize its business, so that competition might live and fight its battles without the fear of being molested by this corporation.

The other day I was at a government fish hatchery and was looking at the multitude of small fish that were swimming around in the tanks. One of the government employes told me that the great trouble with raising fish was to keep the larger and stronger fish from devouring all of the little ones, and that in a number of cases the larger fish had to be separated from the smaller ones to protect the smaller ones from total destruction; and this is just what the American Telephone & Telegraph Company agreed to do—to separate itself from Independent telephony by a voluntary agreement so that the small Independent companies might thrive and prosper without danger of being annihilated.

This was a great victory for competition. It was a recognition that competition had certain rights and privileges, and the government agreed to see that this matter was carried out.

The American Telephone & Telegraph Company went so far as to name two parties of the federal government, namely, the Department of Justice and the Interstate Commerce Commission, to watch over it and see that its promises were kept. So far, so good; but a government and a business must be judged by their acts, or rather by the interpretation of their acts, rather than upon their written promises.

Having made two departments of the federal government responsible, there was no reason to believe that the American Telephone & Telegraph Company would deliberately and openly violate this written promise to the federal government. After I had tried a number of times to get the Department of Justice to make the American Telephone & Telegraph Company live up to its commitment, of December 13, 1913, I read this commitment over again carefully. I found that the Interstate Commerce Commission was as much a party to this commitment as was the Department of Justice. In other words, both the Department of Justice and the Interstate Commerce Commission were named jointly to see that this commitment was lived up to. Failing to get the co-operation of the Department of Justice, I wrote the Interstate Commerce Commission and asked why it had not been asked to rule upon the question of mergers as it was made a judge in the letter of commitment. I received a letter from the chairman of the Interstate Commerce Commission which reads in part:

> This commission was not a party to what you term the commitment made by the American Telephone & Telegraph Company on December 19, 1913. The commission, it is true, was named in that agreement of the American Telephone & Telegraph Company, but without its assent. That company has at no time submitted any matter to this commission for advice or directions with reference to proposed acquisition by it of other telephone properties.

This letter was signed by B. H. Meyers, chairman of the Interstate Commerce Commission.

In other words, the American Telephone & Telegraph Company agreed to do certain things. It agreed to submit to the Department of Justice and the Interstate Commerce Commission all proposed mergers that had not been contemplated prior to date of this commitment; but according to the statement of the Interstate Commerce Commission, it has failed to keep its agreement with that portion of the federal government. Consequently, to my mind, the Interstate Commerce Commission should be asked to rule upon all of the mergers that have heretofore taken place, because according to the commitment, it was to be consulted about these matters and the Department of Justice had no right to allow the American Telephone & Telegraph Company to consummate a merger without also obtaining permission from the Interstate Commerce Commission.

It is a strange institution that is not willing to live up to its own voluntary agreement and if the Interstate Commerce Commission should step in and call this company to account for the violation of this agreement, its right would be perfectly clear, just and equitable. The laws of the country are plain and the American Telephone & Telegraph Company should be made to live up to the federal law just like an individual.

There can be no question but that the American Telephone & Telegraph Company's legal talent has been busily engaged in striving to keep the friendship of the Department of Justice. This is evidenced by the statement made by the Department of Justice to Hon. John K. Shields, when the Department of Justice wrote as follows:

> In fact, the Bell company itself gave the information and

gave it in advance, so that if the department were of the opinion that the acquisitions would violate the commitment, it might object in time to prevent the transaction.

But why did not the American Telephone & Telegraph Company furnish this same class and kind of information to the Interstate Commerce Commission? Why was the Interstate Commerce Commission neglected, while the Department of Justice's friendship was so carefully cherished? This is a problem that I am unable to understand. Was the American Telephone & Telegraph Company afraid of a ruling from the Interstate Commerce Commission and willing to risk the Department of Justice to get it safely by with violations of the commitment? Evidently this must have been the case. And now to my mind, the thing to do is to call the Interstate Commerce Commission's attention in no uncertain terms to the gross violations of the commitment.

There is no question but that severing of the relations of the American Telephone & Telegraph Company is productive of good results. Take for instance the Western Union Telegraph Company. When the Western Union was a part of the American Telephone & Telegraph Company this stock was selling at 60 and it appears to me that there was well defined and concerted effort on the part of the American Telephone & Telegraph Company to force down the Western Union's stock to a low point and then I believe their intention was to take over this company and combine the telegraph and telephone business into one great wire monopoly; but the government stepped in and said to the American Telephone & Telegraph Company, "You must sever your relations with the Western Union Telegraph Company." To some extent this has been done; and what is the Western Union's stock worth today? The quotation in the paper this morning quotes Western Union stock at 95. It is evidently a fine thing for the Western Union stockholders that the government caused this separation, or otherwise there would have been a great number of innocent people who had purchased Western Union stock, who probably would have to take much less for their stock than what they could get at the present time, and the Western Union Telegraph Company has been able to improve its conditions because it is not a part of the monopoly.

Wherever a monopoly starts, it tries to force all portions of that business into the monopoly at a loss to make a profitable parent company. Monopoly is wrong. Its principles are wrong and the sooner the government calls a halt in this direction, the better for the American people.

Telegraph Oddities

He telegraphed for rates, but the dot dropped out and he got rats instead.

A constituent a few days ago telegraphed his congressman asking how he stood on a certain international issue. "I do not stand on it at all, I sit on it whenever the opportunity is given me," was the reply.

A theatrical manager needed someone to take the part of a colored boy in his play. He rang up a messenger, blackened him up and the "mercury" acquitted himself like a professional. The messenger boys are equal to any demand made on them.

A queer case of a difficult cross to locate was caused by a lady operator who had a canary bird in the office. Two or three times a day she would hang the cage near the switchboard where the wires of the cage connected several important circuits and put them out of commission.—*Telegraph and Telephone Age.*

Civil-Service Examination, Telephone Engineer

The United States Civil Service Commission announces an open competitive examination for telephone engineer, for men only, June 21, 1916. From the register of eligibles resulting from this examination certification will be made to fill vacancies in this position in the Forest Service at Denver, Colo., and Portland, Ore., at $1,800 per annum, and vacancies as they may occur in positions requiring similar qualifications at Albuquerque, N. M., Ogden, Utah, and San Francisco, Cal., or other places throughout the United States, unless it is found to be in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

Preference in certification will be given to eligibles examined in the vicinity of the place at which the vacancy occurs, except that upon the request of the department certification will be made of the highest eligibles on the register for the entire country who have expressed willingness to accept appointment where the vacancy exists.

The duties of this position involve executive capacity, including ability to formulate comprehensive plans and to handle administrative correspondence; technical knowledge of all forms of line construction and maintenance in mountainous and in level open country and of switchboard and instrument installation and operation; ability to keep records of lines and service; knowledge of equipment and of the uses and limitations of different forms of material; ability to prepare all forms of specifications, distribute materials and inspect work; familiarity with the plant and traffic departments of commercial telephone companies; practical experience in the handling of men; initiative and ability in conducting investigations of business and technical problems; ability to represent the department creditably in the negotiations of co-operative agreements and the settlement of controversies; and appreciation of the requirements of other National Forest activities.

Fort Wayne Holds Schools

The second of a series of toll operators' schools and telephone managers' meetings was held at Fort Wayne, Ind., April 27, under the auspices of the North-Eastern Indiana Telephone Association. F. V. Newman of Grand Rapids conducted the operators' school and R. V. Achatz, telephone engineer at Perdue University, had charge of the telephone men's meeting. Upwards of one hundred operators were in attendance and they were all highly pleased with the demonstrations by means of lantern slides, which is the method now employed by Mr. Newman in demonstrating operating rules and practices. The managers and their linemen and other employes, who were present at the telephone men's meeting, spent a very profitable day discussing the various phases of telephone work, both switchboard equipment and outside construction, which Mr. Achatz explained in a most masterful manner.

Asuncion, Paraguay, has had no telephones for about three years. A system was installed by a company under a concession, but about three years ago the central office was destroyed by fire and has never been rebuilt. It is said that an English company will endeavor to obtain a concession to install telephones. A properly managed system there should be a profitable investment, reports Consul Samuel H. Wiley, and it is probable that a liberal concession could be obtained from the government for its construction.

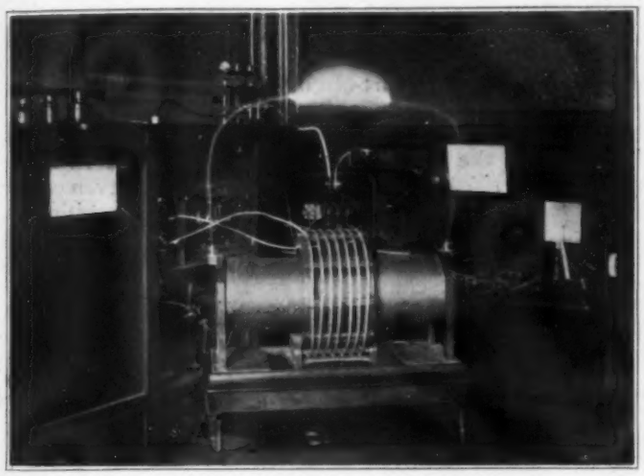
The Telephone Scrap Book

Curious and Useful Items, Mostly Telephonic, Gathered from Everywhere

Experiments with a Tesla Coil

THE illustration shows the construction of a "Tesla" coil built by Louis Mühlheizler and F. M. Weaver of the Pittsburgh & Allegheny Telephone Company. The coil was constructed in the company's shops, Miller building, Pittsburgh, Pa.

The cut shows the coil in actual operation. The company's regular wireless equipment, previously described, is used in connection with the operation of this coil. It has a 1-k.w. transformer; in the primary of this transformer



Muhlheizler and Weaver's Tesla Coil.

is used 110 volts 60-cycle current; in other words, the low tension alternating current furnished by the light company. This voltage is stepped up in this transformer to 20,000 volts to the primary of the Tesla coil, which is shown in the photograph. This, in turn, steps up the voltage in the Tesla coil to 750,000 volts. This produces a 15-inch spark, as shown in the photograph.

Another photograph, not printed, shows the same coil in operation with Mr. Weaver holding a 25-watt, 110-volt tungsten lamp, which is lighted to full candlepower; 750,000 volts passing through his body lighting the lamp.

There are many queer phenomena connected with high frequency currents, such as are produced by a Tesla coil. When a current reverses its direction several hundred thousand times a second, many weird effects are produced on account of the factor N (number of alternations) in the alternating current formula being so high that everything must come its way, referring to apparent resistance, effects of small inductances, etc., in the circuit becoming magnified in effect. An example of this is seen in the primary circuit of a Tesla coil where only a few turns of wire are required to induce a higher voltage in the secondary coil.

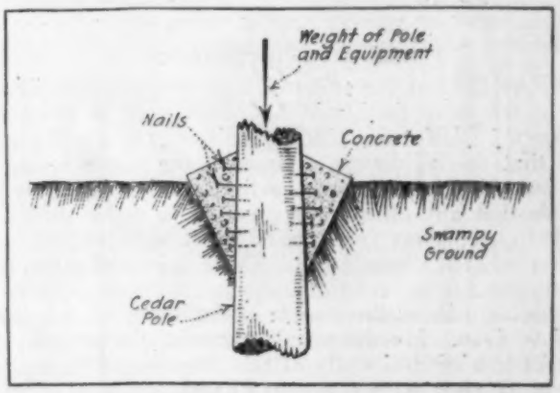
The coil was made up from odds and ends of material in the shop. The primary consists of 8 turns of heavy stranded wire (49 No. 19 wires equivalent to a No. 2) 12 inches in diameter and wound on a woden cage. The secondary is composed of 630 turns of No. 28 enameled and double cotton covered wire wound in one layer on a pasteboard tube 8 inches in diameter and 26 inches long. The coil gives about a 15-inch spark on 1-k.w. wireless transformer with 20,000 volt secondary. Across the 20,000 volt secondary is connected a high voltage condenser composed of 18 plates of 32 gauge sheet brass and separated by double 8x10 photo plates. The condenser is set in a square storage battery jar and filled with linseed oil.

The transformer secondary and condenser is connected to the Tesla coil primary in series with a rotary spark gap.

Owing to the "skin" effect, currents of high frequency travel almost wholly on the surface of the conductor. It is estimated that this coil gives about 750,000 volts with a corresponding decrease in amperage as the voltage is raised. Owing possibly jointly to the low amperage and the fact that the current travels on the surface, it can be taken through the body harmlessly and almost unfelt. Although the voltage is very high and the current in amperes very low, yet the coil consumes over 1-k.w. and it can be proven that considerable current can actually be taken harmlessly through the body by taking it in series with a 110-volt lamp, which lights to full brilliancy, as was demonstrated. Many other interesting experiments can be performed with these high frequency currents.

Poles Kept from Sinking in Swampy Earth

WHEN poles are set in swamps, they may be held in a vertical position by proper guying, but under such conditions something besides guy wires must be used to prevent them from sinking axially into very soft, yielding earth, says the *Electrical World*. Poles bearing heavy apparatus or poles under compression due to the line itself are especially liable to sink. This tendency was overcome by the builders of an Ohio transmission line by the scheme shown in the accompanying illustration. At the ground line and just below, heavy nails were driven part way into the pole as shown. Around the pole and over these nails a circular, wedge-shaped section of concrete was molded. The nails held the concrete firmly to the pole, and the concrete itself gave sufficient additional bearing surface to prevent further sinking.



Wedge-Shaped Concrete Collar to Prevent Poles Sinking.

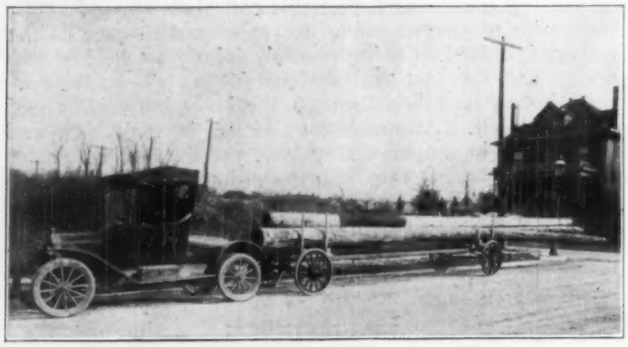
The man who walks home to save carfare always needs a cigar and a couple of drinks to help him along.

A Trailmobile for Telephone Poles

By Frank C. Perkins.

THE accompanying illustration shows a novel trailmobile for telephone and telegraph poles developed at Cincinnati, Ohio, to meet the demand from different telephone and telegraph companies throughout the country for a quick method of delivering the long poles. This trailmobile is loaded to its capacity, one of the poles being 45 feet in length. The chassis has a capacity of 2,000 lb. The wheelbase measures 17 feet 5 inches, and solid truck tires are used, the front being 2 inch and the rear 6½ inch. The frame is of steel angle section measuring 19 feet 5 inches from front to rear cross members.

There are 6 cross members, gusseted and riveted to side rails, and the truss rods under side rails are of



Trailmobile for Poles.

⅝ inch iron with ends riveted to side rails at front and rear cross member. The weight is 800 lb.

A similar trailmobile has been designed for lumber hauling to carry light loads of 16 foot lumber. It has a wheelbase of 101 inches, with frame of steel angle section having 4 cross members, riveted to side rails. It has a capacity of 2,000 lb. or 1,000 feet yellow pine sheeting, 16 feet by 6 inches by $\frac{1}{16}$ inch and has a weight of 700 lb.

The trailmobile may be used behind any automobile, whether pleasure car or truck, on which the rear cross member is available for a coupler, and is made in carrying capacity from 1,250 to 1,800 lb.

Inductive Interference

SPEAKING of the effect of high frequency oscillation on telephone lines, said A. J. Bowie, Jr., in discussion before the California Joint Committee, it is a well-known fact that the higher the frequency the worse would be the inductive effect upon the lines, and it is highly desirable that any effort it is possible to make should be made to keep away from the effect of high frequency, no matter what it comes from. There appeared some time ago in the *Electrotechnische Zeitschrift* some articles by Doctor W. Linke; these were in the issues of July 2 and July 9, 1914. He discussed transient phenomena. He had made a general study of this phenomena from many points of view with different phases, kinds of circuits, conditions and kinds of switch apparatus; and the result of this is published in the two issues referred to. In particular he discusses the effect of different types of switches, and arcs found in the different types of switches, and the voltage variation, particularly with reference to the creation of harmonics in their own circuits. He has made tests of both oil switches, air switches without horns, and air switches with horns. His conclusions are that the oil switch causes the most serious harmonics, but the air switch without horns was gentler in its action, and that the air switch with horns was ideal

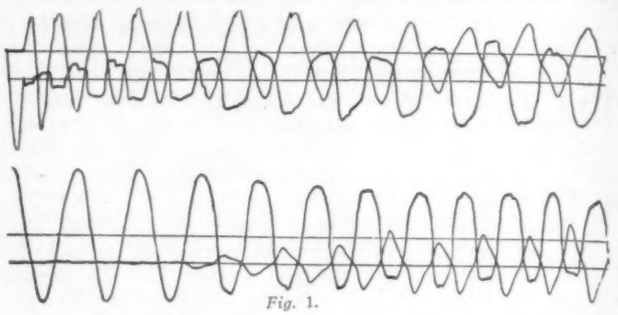


Fig. 1.

in its action in suppressing the harmonic and gradually reducing the current before the point of final break.

Among others he made a test on a 10,000-kw. generator, which was short-circuited by a horn-break air switch. The generator was brought up to normal voltage before the short-circuiting. The phenomenon of opening is shown by the oscillograms. The voltage curve does not show a single sharp peak or quick rise, even with the rising of the arc on the horn, and likewise with the gradual increase of resistance the voltage rises from the moment of short-circuiting slowing to the normal height, while the current changes to zero. This is shown in Fig. 1. Fig. 2 shows the corresponding test made with the oil-break switch.

There has been a certain amount of misunderstanding of the action of arcs in air, which I think is being gradually straightened out as further experiments throw more light on the subjest. At first it was supposed that the arcs which occurred in air caused destructive rises of voltages on their own circuits. It has been pretty well disclosed by many tests which have been made, among them some made by W. P. Hammond which appeared about a year ago in the *General Electric Review*, and showed definitely that the rise of voltage which occurred from opening the horn type of switch was less than that which occurred in opening the air type of switch. Having disproven any material rise of voltage occurred on their own circuit, they were finally confronted with the fact that the arc may affect the neighboring circuit.

There are only three cases in which a rise of voltage

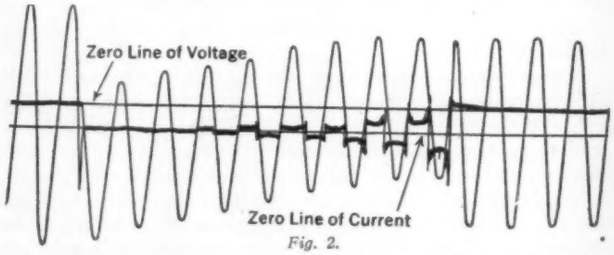


Fig. 2.

can occur on the power circuit which will affect the telephone circuit. The one is from a natural rise, from the opening of the switch; the second is from harmonics; and the third is from the unbalanced condition which will result from one phase opening in advance of the other phases. We cannot say definitely, either with an oil switch or an air switch, that all three phases open at the same time, in fact, it is doubtful whether they do; but no definite data have been brought forward on this subject one way or another. It is a matter which should be investigated further before any rules or regulations are passed on the subject.

Blasting Pole Holes

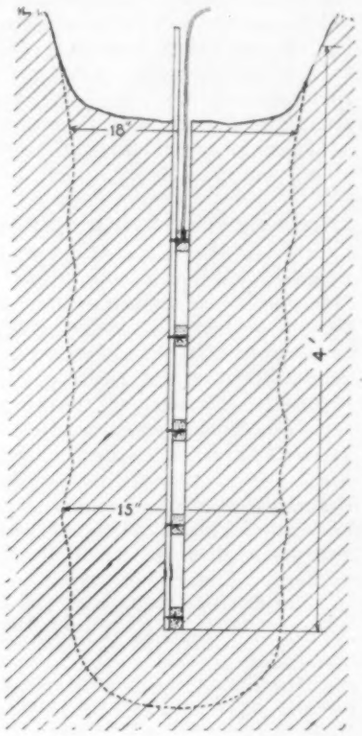
THE digging of pole holes is slow and expensive, especially where the ground is at all hard. To hasten the work and at the same time reduce the cost, excellent use can be made of explosives.

For shallow holes of this nature a small hole is drilled or punched to the desired depth. A light charge of explosives is loaded in the bottom and fired. This will loosen the soil and make digging easy.

For deeper holes a bore hole is put down to the desired depth. Small charges of dynamite are tied at intervals of several inches, to a straight stick or lath, the upper one being primed with a blasting cap and fuse. This is lowered into the hole and fired. Forty per cent or stronger dynamite should be used.

The blast will result in crowding back and loosening the soil so that practically no hand labor is required.

No matter which method of loading is used, better results will be obtained if the surface is spaded out to a depth of several inches before the blast is fired.



Method of Loading for Pole Hole Blasting.

This method of digging holes has proven so effective that the Du Pont Company has prepared a special book on the subject. This may be had on application to the company.

The Southern States Convention

The Southern States Independent Telephone Association held a rousing convention at Knoxville, Tenn., May 23 and 24. The meeting was held at the Stratford hotel, and between 150 and 200 delegates from all parts of the South were present. The following program was closely followed:

TUESDAY, MAY 23.

9:00 A. M. Meeting of the Board of Directors.

10:00 A. M. Address of Welcome by the Knoxville Chamber of Commerce. Response, W. H. Bryant, Mobile, Ala. "Transmission Benefits," O. F. Cassidy, Chicago, Ill. Report of the President. Report of the Secretary. Appointment of Committees.

12:00 M. Photograph.

2:00 P. M. Some Hints on Association Work, by W. S. Vivian, Secretary of the United States Independent Telephone Association, Chicago. "Hope of Independent Telephony," by W. H. Bryant, Mobile, Ala. "The Bell Telephone Co., and the Government," Terry W. Allen, Jackson, Tenn. "A Talk on the Far West," J. C. Kelsey, Chicago.

5:00 P. M. Visiting Exhibit Rooms.

8:30 P. M. Jovian Rejuvenation.

WEDNESDAY, MAY 24.

9:00 A. M. Report of Committees. "The Telephone and the Government," F. B. MacKinnon, Washington, D. C. "Some Rural Line Suggestions," J. B. Wilkinson, Louisville, Kentucky. "Collection Efficiency," B. A. Grant, Corinth, Miss.

12:00 M. Visiting Exhibits.

2:00 P. M. "Kentucky Conditions," S. M. Heller, Louisville, Kentucky. Election of Officers. "Foreign Trade," F. W. Pardee, Chicago, Illinois. "Telephone Development," J. F. Hayden, High Point, N. C. Short Talks by J. N. McGregor, Memphis, Shirley Lewis, Jackson, Tenn., Minor Corman, Louisville, E. T. Aisthorpe, Cairo, Ill., G. J. King, Elyria, Ohio, W. A. Munding, Memphis.

4:00 P. M. Automobile ride—sight seeing of Knoxville.

5:30 P. M. Visiting Exhibits.

7:30 P. M. Smoker.

During the sessions these resolutions were adopted with general enthusiasm:

Resolved, that the thanks of this association be given to Mr. Ashbury Wright for his able address of welcome and to the Board of Commerce for their cordial reception and the use of their rooms for the meetings of this association.

Resolved, that the thanks of this association be given the Stratford Hotel for the many courtesies extended the members of the association.

Resolved, that the thanks of this association be given the Knoxville *Journal* and *Tribune*, and the Knoxville *Sentinel* for their kindness in reporting the sessions of the association.

Resolved, that the thanks of this association be given the Peoples Telephone & Telegraph Company of Knoxville for the splendid entertainment afforded the delegates of this association, and especially to Mr. J. C. Duncan for the splendid social program.

Resolved, that this association endorse the action of the Board of Directors of the United States Independent Telephone Association in passing a certain resolution which reads as follows: "Resolved that the officers of the association be directed to protest to the Department of Justice in the name of the association, any apparent violation of the Kingsbury Letter of Commitment and that copies of this resolution be sent to the Department of Justice and the Secretary of the United States Independent Telephone Association."

Resolved, that the Southern States Independent Telephone Association strongly endorse the enforcement of a certain agreement between the Department of Justice of the United States and the American Telephone & Telegraph Company in settlement of pending litigation, given December 19, 1913, and commonly known as the Kingsbury commitment, and, further, it is regretted exceedingly that so many apparent violations have been permitted to be consummated without any action on the part of the Department of Justice, and that a copy of this resolution be sent to the Department of Justice.

Resolved, that this association protest against the purchase of apparatus and supplies from the Western Electric Company by Independent telephone companies, and against the contemptibly insulting methods used by said Western Electric Company in its efforts to sell to Independent telephone companies.

Resolved, that the Southern States Independent Telephone Association respectfully call the attention of the Federal Trades Commission to the unfair methods used by the American Telephone & Telegraph Company-Western Electric Company combination in soliciting business from Independent telephone companies, and that a copy of this resolution be sent to the Federal Trade Commission for their information.

Resolved, that this association express its appreciation of the splendid work of Mr. Terry W. Allen, editing and publishing the *Southern States Telephone News*, and further that we heartily commend and endorse the matter which has appeared in its columns.

Resolved, that the association express its sincere sympathy to Secretary W. N. McAnge, Jr., because of his serious illness and that we wish him an early and speedy recovery.

Resolved, that this association express its appreciation of the splendid co-operation of the manufacturers and supply dealers and their representation in providing interesting and educational exhibits and assisting in other ways in making the convention successful.

Resolved, that this association express its appreciation to the United States Independent Telephone Association in sending Chairman E. B. Fisher, Vice-President W. H. Bryant, and Secretary-Treasurer W. S. Vivian, to us for the purpose of representing their association in our deliberations and otherwise co-operating with us in the realization of an interesting and successful convention.

Resolved, that the thanks of this association be sent to the American Zinc Company for its courtesy in showing our members through its Mascot works.

Resolved that the Southern States Independent Telephone Association disapprove of any attempt to modify or postpone any section of the Clayton Anti-Trust Act and that a copy of this resolution be sent to all senators from the states represented by the Southern States Independent Telephone Association.

Resolved, that this association commend the continuous attitude of Telephone Engineer in the interest of Independent Telephony—also the attitude of *Telephony* during the past two months.

Resolved, that this association commend the United States Independent Telephone Association to its membership and urge that its members join said association and co-operate with them in every possible manner.—(Signed) Terry W. Allen, J. C. Duncan, W. S. Vivian.

For the ensuing year, S. M. Heller, Louisville, Ky., president; J. C. Duncan, Knoxville, Tenn., vice-president, and W. N. McAnge, Jr., Corinth, Miss., secretary, were elected, as well as Directors Terry W. Allen, Jackson, Tenn.; W. H. Bryant, Mobile, Ala.; Charles Chandler, Middlesboro, Ky.; J. M. McGregor, Memphis, Tenn.; and Dr. W. L. Moor, Tallahassee, Fla.

A. I. E. E. Convenes by Telephone

Over 5,000 persons, thousands and thousands of miles apart in various parts of the country, heard one another talk May 16, when the American Institute of Electrical Engineers held a national meeting simultaneously in six cities of the United States, a feat never before accomplished in the history of the world.

It was done by means of cross-continental telephone connections with a telephone receiver running to the ear of each listener, who heard the addresses made by some of America's leading scientists, as well as national airs played in the six American cities.

The national meeting was held to commemorate the achievement of its members in the fields of communication, transportation, lighting and power.

"What hath God wrought?" said one of the speakers at New York.

A moment later Atlanta, in session at Taft hall, switched in on the wire with the strains of "Dixie."

A few seconds later Boston switched in with "Yankee Doodle;" Chicago followed with "America;" New York City with "Hail, Columbia;" San Francisco with "Columbia, the Gem of the Ocean," and Philadelphia concluded with "The Star Spangled Banner," during which the 5,000 listeners paid tribute to "Old Glory" by rising from their seats and standing throughout the martial music.

The national meeting was called to order by President John J. Carty, who, at 8:30 eastern time, banged his gavel on his desk at the society's building in New York City.

President Carty ordered the secretary to call the roll of cities, which met with responses from six cities.

Following the president's address of greeting, a report of the election of officers was made, from New York, and it was announced that H. W. Buck of New York City had been nominated president-elect. He was introduced over the wire, and thanked his friends of the society for the honor conferred on him.

Brief addresses were delivered by Dr. Alexander Graham Bell and by Theodore N. Vail.

After each meting in the various cities had transacted its local business and listened to addresses by speakers present, the widely separated gatherings resolved themselves into a general meeting, and wire connections were resumed.

After several short speeches, President Carty in New York asked:

"Is there any other business to come before the meeting?"

From across the continent came the voice of A. H. Holbrook, in San Francisco, offering a resolution to spread a record of the proceedings upon the minutes of the institute, "where, for generations to come it will serve as an inspiration to engineers everywhere and mark an epoch in the history of American engineering achievement." The resolution was carried by a concerted voice vote from all six cities.

A. M. Schoen, in Atlanta, then moved that the meeting adjourn; P. J. Norton, in Chicago, seconded the motion, and adjournment was taken by a chorus of "ayes" that resounded from ocean to ocean.

City Ownership Figures in Los Angeles

That the city of Los Angeles can establish a municipal telephone system for approximately $5,700,000, either by condemning necessary portions of the Sunset system, or establishing its equivalent capable of serving 60,000 subscribers, is the substance of a report approved by the Board of Public Utilities and ordered forwarded to the City Council without delay.

The report was prepared by Chief Engineer F. D. Howell and Assistant Chief Engineer Charles H. McGuire of the utilities department, and answers in detail the seventeen questions recently propounded by the City Council relative to the telephone situation and the possibility of establishing a municipal telephone system. The report says:

The $8,000,000 bond issue proposed is more than sufficient to take over those parts from the Sunset system that are useful to the city, together with the additions necessary to make a complete plant.

The Sunset company on the expiration of its franchise in the city could then remove practically all of its portable property, switchboards, instruments, etc., and their loss would be nil on this account.

It is a question of condemning only that portion of the present plant that would be fully adequate for the service to which it is to be put, from a company no longer in business, and has a plant that it can no longer use and which it can be compelled to remove.

A telephone system should be under the direction of a general manager or general superintendent, who could report to any commission organized along business lines, acting as a directorate.

Operation, maintenance and depreciation, we would estimate not to exceed $1,500,000 on the basis of present Sunset equipment with modern plant as outlined, and without heavy overhead charges, and bond interest, sinking fund and stock dividends, we believe that this amount would be reduced to between 25 and 35 per cent. The rates could be reduced in proportion.

Franchises held by the Sunset, but not granted by the city, the engineers say, are in San Pedro, the San Fernando Valley and the Palms. The engineers report that the company could have local stations for outside business now operated from city stations.

As to the city interchanging messages with the Home company, Engineers Howell and McGuire say this could be done and the approximate cost would be $100,000, and less if no account were required of interchange calls.

The engineers assert that the Sunset company could have no redress against the city on account of severance of long-distance or suburban service, because long-distance is an independent service and because the company's franchise expires in November.

Your friend who refuses to take a receipt when he pays you money may some day imagine he has paid your bill—and you can't ask him to prove it.

MINNESOTA TELEPHONE NEWS

BY THE MINNESOTA INDEPENDENT TELEPHONE ASSOCIATION
326 McKnight Bldg., Minneapolis, Minn.

APPLICATION OF THE NORTHWESTERN TELEPHONE EXCHANGE COMPANY TO PURCHASE THE MAJORITY OF THE STOCK OF THE CITIZENS TELEPHONE COMPANY OF MONTEVIDEO APPROVED BY THE COMMISSION.

IN AN order issued under date of April 29, the Commission authorized the sale of the majority stock of the Citizens Telephone Company of Montevideo to the Northwestern Telephone Exchange Company. The case was heard by the Commission at its office on March 3, all members being present.

The Northwestern Company petitioned the Commission for the right to purchase a majority of the stock of the Citizens Company. The petitioner operates a comprehensive system of toll and exchange properties in the states of Minnesota, North Dakota and South Dakota, and is a part of what is known as the "Bell system." The Citizens Company owns and operates an exclusive exchange in Montevideo, and its lines extend to and include the local service at Watson. The Tri-State Telephone and Telegraph Company also operates an extensive system of toll lines and exchanges within the states of Minnesota, Wisconsin, North Dakota and has connections into South Dakota.

The Citizens Company has 2,624 shares of stock outstanding, practically all of which is owned by local parties. It has 840 subscribers at Montevideo, 40 at Watson and 400 rural subscribers, making a total of 1,280. The company gives a good service, has been declaring dividends regularly, and has accumulated a depreciation fund of $11,000. Substantial improvements at an estimated cost of about $20,000 will have to be made within a few years. The toll lines of the Northwestern Company and the Tri-State Company do now, and for many years have connected with the Montevideo exchange, and during all of such time the local company has given the same quality of service to each toll line. The Tri-State Company's contract was executed September 29, 1905, and by its terms the connection was to continue for a period of five years from the first day of September, 1905, and thereafter until ninety days' notice in writing should be given by either party of its intention to terminate the same. The contract fixes a connection fee of five cents on each and every paid in-coming and outgoing message.

The proposition to sell the local plant has been under consideration for the past three years. Those owning 1,493 shares of stock have agreed to sell to the Northwestern Company their stock at $25 per share. This stock is owned as follows: H. Leroy, 436 shares; R. S. Bacon, 432 shares; R. Arnold, 432 shares; F. E. Bentley, 193 shares; total, 1,493 shares. Each of the above named parties appeared at the hearing and favored the sale.

This leaves 1,131 shares of stock outstanding. Twenty-five dollars per share is the full value of the stock. There was no appearance on behalf of the minority stockholders. The Northwestern Company claims that it is in position to give an improved service and that it has no intention of increasing the local rates. The Tri-State Company objects to the sale upon the ground that it will tend to create a monopoly, destroy competition both as to state and interstate business, deprive the Tri-State Company of its terminals and connections with the local exchange, and even though the connection be allowed to remain that it will lose toll business because the local plant will be under the entire control of the Northwestern Company, which is its strongest competitor.

Section 20 of Chapter 152, *G. L.* 1915, reads as follows:

> It shall be unlawful for any telephone company, subject to the provisions of this act, to purchase property or capital stock, bonds or other obligations of any other telephone company doing business within the State, without first obtaining the consent of the commission thereto. Nothing herein shall be deemed to prevent the holding of stock heretofore lawfully acquired or to prevent the acquisition of additional stock by any telephone company owning a majority of the stock of any telephone company at the time of the taking effect of this act.

The statute authorizes the Commission to permit the purchase of a majority of the shares of stock of a telephone company. Manifestly this power should not be exercised without safeguarding the rights of the minority shareholders, and in this case it can best be done by the Commission requiring the Northwestern Company to purchase at not less than $25 per share, all of the minority stock which may be tendered to it within one year from the date of this order. Notice of the intention to purchase must be mailed to the known address of each shareholder on or before July 1, 1916, and proof of such notice filed in the office of the Commission.

In consenting to the purchase the Commission must have in mind the effect which a consolidation will have upon the rates, service and competitive conditions. A purchase should not be allowed which would adversely affect the public interest. At the present time the Citizens Company operates an exclusive exchange and it has a monopoly of the local business in Montevideo and Watson. No greater monopoly of the local exchange business will be created by transferring a majority of the stock to the Northwestern Company. With its superior knowledge, experience and financial condition, it should be able to give a better class of telephone service to the public than is now enjoyed. In all probability the ownership of the local exchange will give the Northwestern Company some advantage over the Tri-State Company in handling of through or toll business. A local subscriber seeking to talk over the toll line is principally interested in prompt and efficient service and as a general proposition does not care what line he uses, and the local operator may be expected to send unrouted toll line messages over the Northwestern Company if connection can be made with the party at the other end. The Citizens Company has seen fit to give a connection to the Tri-State Company since 1905 and the fact that the service has been continued is strong evidence that there is public demand for that connection. This situation should not be disturbed. The fact that the local subscriber has the privilege of using either toll line should influence the quality of service given by competing toll lines. Under the facts in this case the Northwestern Company should be required to give its subscribers and patrons the same facilities, quality of service, and convenience for connection and transmission of messages over the Tri-State Company as it does over its

own line. In short, this consolidation should preserve all connections of the various properties so as to extend rather than curtail the use of telephone facilities.

It is therefore ordered by the Commission that the Northwestern Telephone Exchange Company be permitted to purchase a majority of the shares of the stock of the Citizens Telephone Company of Montevideo, Minnesota, at $25 per share; upon condition that it will purchase at not less than $25 per share, all of the minority shares of stock which may be tendered to it within one year from the date of the order, and to mail a notice of its intention to the known address of each of said stockholders before July 1, 1916, and file proof of the same with the Commission; and also, upon the further condition that it preserve the connection that now exists between the Citizens Telephone Company at Montevideo and the toll line of the Tri-State Telephone and Telegraph Company, and that it give to its subscribers and patrons the same facilities, quality of service, and convenience for connection and transmission of messages to and from subscribers and patrons over said toll line as it does over its own, and that it preserve all other connections with rural lines which are now maintained by the local company. This order is effective from and after the 15th day of May, 1916.

TRI-STATE COMPANY SURRENDERS ITS FRANCHISES IN MINNEAPOLIS AND ST. PAUL AND IS GRANTED INDETERMINATE PERMITS BY THE COMMISSION.

It is reported that in order to facilitate the marketing of additional securities for making $2,000,000 worth of improvements in the Twin Cities, including the installation of automatic service, the Tri-State Telephone and Telegraph Company has surrendered its franchises in Minneapolis and St. Paul and will hereafter operate under indeterminate permits granted by the state.

Under the Minnette-Burrows bill, indeterminate permits are granted to telephone companies surrendering their local franchises and remain in effect until withdrawn on account of the purchase of an exchange by the municipality.

This change of operation under the franchises to indeterminate permits does not effect, or alter in any way, the advantages assured the cities in the original franchises, as all of the provisions regarding rates, number of telephones, construction of lines, etc., remain in force. Any changes in rates or class of service cannot be made in either case, however, without permission from the State Railroad and Warehouse Commission.

APPLICATION OF THE STAR TELEPHONE COMPANY OF FARMINGTON, MINNESOTA, FOR AUTHORITY TO ESTABLISH TOLL RATES BETWEEN ALL EXCHANGES SERVED BY ITS SYSTEM.

Application has been filed by the Star Telephone Company, in which it is alleged that the free service as now existing between all of its exchanges is being abused to the extent that prompt and efficient service cannot be given and that to provide earnings sufficient to enable it to give good service and to secure a reasonable return on the investment, it is necessary to establish a toll rate of 10 cents for three minutes and 5 cents for each additional minute between each and all of the following towns: Farmington. Lakeville, Lonsdale, Mendota, New Market, Prior Lake, Rosemount, Webster.

A hearing was held by the Commission in the City Hall at Farmington at ten o'clock on the 18th of May, when evidence was given for and against the granting of such application. J. W. Howatt, supervisor of telephones, represented the Commission. Considerable opposition developed among some of the stockholders as to making the proposed toll rate.

TRI-STATE COMPANY BIDS GOOD-BYE TO THE "HELLO" GIRL IN ST. PAUL.

It was announced by the Tri-State Telephone and Telegraph Company that on May 28 the service in St. Paul would be changed from manual to automatic operation. Although the actual change is made in a few minutes, it has taken about eighteen months of work by many men working day and night to complete the St. Paul end of the new automatic Twin City system. Minneapolis will not be ready for the cut-over until next fall.

Every telephone in St. Paul has been equipped with a dial, each instrument carefully tested, all necessary wiring completely connected and full instructions issued through the new directory, as to the operation, so that beginning on the above date every user of the telephone will be able to call any number in the city without the aid of central.

OWATONNA PHYSICAL CONNECTION CASE HEARING POSTPONED.

W. F. Sawyer, city attorney of Owatonna, has requested and been granted a postponement in the case of the city vs. Northwestern Telephone Exchange Company and Tri-State Telephone & Telegraph Company, from 10 o'clock, May 22, at the Capitol, until June 5, at the same hour and place.

ASSOCIATION NEWS ITEMS.

Albert J. Anderson, age 41 years, died at his residence, 901 Vernon avenue, St. Paul, Wednesday, May 17. Mr. Anderson was well known in Independent telephone circles throughout the Northwest and until his death was secretary and manager of the Northwestern Electric Equipment Company of St. Paul, which position he held for the last twelve years. About last Christmas time he was suddenly stricken with a form of apoplexy and since then has been confined to his bed, gradually growing weaker all the time. He is survived by his widow and five children, to whom the M. I. T. A. extends the heartfelt sympathy of its members.

Madelia: The Madelia Telephone Company is planning to install a new switchboard very shortly.

Waldorf: The New Richland Telephone Company has now under way the construction of a new telephone exchange in this village.

Ellendale: At a recent meeting of the Ellendale Farmers' Telephone Company, it was voted to build a new line from Ellendale to Old Cooleyville.

Foley: (Gilman.) The farmers in this vicinity are now planning on building their new telephone line.

Windom: The Dale Mutual Telephone Company's lines are now connected with the exchange and toll lines of the Tri-State Company.

West Manchester: It is planned to establish in Manchester a consolidated switching station in connection with the present exchange.

Springfield: The council has recently authorized the street committee to arrange with the Tri-State Telephone Company as to how its toll lines are to reach the local exchange from the corporate limits.

Anoka: (Crooked Lake.) John Augustson is about to build a new telephone line across Crooked Lake.

Hutchinson: The Hutchinson Telephone Exchange is now busy putting its lines under ground throughout the business district.

Morgan: The farmers in the vicinity of Morgan in Eden township have been reported as organizing a farmers telephone company.

Osseo: The Rural Telephone Company of Osseo has recently completed its proposed improvements for central office

equipment and now has a new two-position board in operation.

FLENSBURG: The Farmers Mutual Telephone Company is about to build a rural line to Little Falls which will connect with the local exchange of the Bell Company.

DULUTH: The Zenith Telephone Company is about to lay 60,000 feet of conduit in Duluth and construct twenty miles of rural lines in this vicinity.

ELLENDALE: It is reported that Frank McDonald of Faribault has purchased the telephone exchange at Ellendale.

HERMAN: The Grant County Telephone Company, which owns the exchange here, have started to make necessary improvements.

SPICER: Bids have been asked for constructing a new telephone central office at this place. The plans and specifications are in the hands of the building committee. D. F. Johnson is the recorder.

LAMBERTON: The Northwestern Company through its local representative at this place reports the proposed construction of rural lines north of town to connect with the exchange.

SHEVLIN: A new telephone line is contemplated from Shevlin, east to the township of Shevlin.

GRAND MARAIS: The application of the Northern Minnesota Telephone & Telegraph Company for permission to build a toll line through Cook county has been referred to the Railroad and Warehouse Commission for action.

TOFTE: The local telephone company is planning to improve the line between Tofte and Cramer this spring.

MENAHGA: The Menahga Telephone Company is about to build an addition to its central office building.

CHOKIO: P. J. McNally and John McNally, Jr., have sold their interests in the Chokio Telephone Company to S. Burt, Carl Leman and others.

BACKUS: The annual meeting of the May Northern Telephone Company was recently held and the following directors elected: John C. Martin, James Reavick, John Bremer and others.

ALBANY: Ben Lampke, Arthur Burrow, Reinhart Jopp, Fred Sager, J. Hamann and G. Eggert are about to build a rural line to connect with the local exchange.

BEMIDJI: The Nary Telephone Company has asked the aid of the Bemidji merchants in building a rural line that will connect with the Bemidji exchange of the Northwestern Company.

BRAINERD: The Tri-State Telephone & Telegraph Company has commenced construction on its new toll line from Moose Lake to Brainerd, which will give the automatic exchange of the Minnesota Telephone Company at Brainerd direct connections with the Twin Cities and Duluth.

LAKE CITY: The Lake City Commercial Club has complained to the State Railroad and Warehouse Commission, claiming that the toll rates of the long distance companies are too high. An answer has been filed by each of the companies denying the complaint.

Grounded versus Metallic Rural Lines

BY A. J. SEYMOUR

Chief Engineer Tri-State Telephone and Telegraph Company, St. Paul, Minn.

The cost of metallic circuits over single or grounded wire for rural service has been the principal factor governing the building of this class of construction, and especially at this time, when iron wire is practically one hundred per cent higher than it was a year ago, will tend further to influence the building of single wire lines.

There are several features which should be considered besides first cost of single wire compared with metallic circuit. First is service, of which transmission is the principal factor. Induction seriously interferes with transmission. If the telephone line happens to be in close proximity to high tension transmission lines or traction power wires it will be impossible to obtain quiet transmission free from the annoying hum caused by induction. Then if there is more than one grounded circuit on the same pole lead there will be cross talk which cannot be eliminated. The question of protection is of vital importance, as a grounded line affords much more attraction to lightning than a metallic circuit, whose path to ground is only through the protectors and not through the apparatus.

Coming back to the question of first cost, figuring on 34 20-foot 5-inch poles to the mile set will cost approximately $70.00 per mile. One single wire or brackets, including insulators and stringing, amounts to about $15.00, and, assuming four telephones to the mile at a cost of $17.50 each, installed, make a total investment of $155.00. Now to make this line metallic would cost $15.00 additional, or an increase of less than ten per cent of the total investment. In cases where there is more than one circuit on a pole line they should be metallic.

The rural subscriber is now as discriminating as his city neighbor and is demanding the same class of uninterrupted service.

Automatic Sells Patent Rights

From time to time rumors have been circulated that negotiations were pending between the Western Electric Company and the Automatic Electric Company, but just what these negotiations covered was a matter of doubt.

It is now confirmed that an arrangement has been consummated by which Western Electric Company acquires the right to manufacture Automatic telephone apparatus under U. S. patents of the Automatic Electric Company. As a result of this agreement, the field for the use of automatic telephony is very greatly broadened.

It is definitely stated that Western Electric Company acquires no interest of any nature in Automatic Electric Company, and this statement should set at rest any rumors to the ocntrary.

Chicago papers carried the following announcement:

The Automatic Electric Company is reported to have sold to the Western Electric Company certain rights to manufacture goods under the Automatic Electric patents for $2,000,000. In consequence the trustee for the $1,000,000 bond issue of the company will call in the issue at par.

The bonds bear 6 per cent interest and mature on January 1, 1928. A recent report of the company showed that there are outstanding $784,400. The bonds in the last few days advanced from around 65 to 100, and the stock was moved up from 32 to 57 bid yesterday. The shares were offered at 60.

"Give Your Telephone a Personality"

Under this heading, the *Southwestern Retailer and Manufacturer* recently carried the following good editorial:

Don't forget that your telephone is a big asset of your business.

Advertise your telephone and the number to the public. The ease of securing the service of your store will appeal to any customer. Have several phones, if your business is done largely by orders over the phone, for if a customer finds your one phone always busy the chances are that your competitor will get the business.

Make your store seem like it is in immediate personal touch with all the households in your town and community. You can only do that by giving instant service to your customers.

Give your telephone a personality. You can do that by advertising it, and thus fixing it plainly in the mind of the public, just as surely as you can fix the name of your store in the mind of the public.

This is good advice, and telephone companies should never cease to urge their subscribers to adopt it.

Wage Commission Busy in Arkansas

Increases of $2.50, making the wage of five telephone operators at Harrison, Ark., $32.50 per month each, were granted by the Minimum Wage Commission, after a conference with R. H. Emory, manager of the Boone County Telephone Company and Troy Pace, representing the operators, at the office of Labor Commissioner J. C. Clary.

Telephone Patents Issued Recently

A Brief Digest of those Current Specifications Most Interesting to Telephone Men

BY DAVID S. HULFISH

NO. 1,173,560. Semi-Automatic Exchange. Issued to H. P. Clausen, Assignor to Western Electric Company, New York, N. Y. A call is answered by plug and jack, but the operator uses automatic switches instead of a calling plug. When a party line calls for another station upon the same line, a special busy test announces the fact and the operator opens the circuit to the answering jack and permits the conversation upon the calling end of her semi-automatic link.

1,173,564. Callsender. Issued to A. H. Dyson, assignor to Kellogg Switchboard & Supply Company, Chicago, Ill. The callsender is designed for an operator's use in semi-automatic systems. A bank of keys like an adding machine is used. When keys have been set, a motor sends series of impulses corresponding to the keys set.

1,173,655. Phantom System. Issued to F. H. Fay, Thomas Shaw and J. J. Pilliod, assignors to American Telephone & Telegraph Company, New York, N. Y. Where two physical circuits are phantomed for a portion of their length, a system of windings having mutual inductances are used at the point where the phantom circuit is taken off to avoid confusion by unbalanced lines and to prevent reflection losses in the circuits.

1,173,772. Semi-Automatic System. Issued to E. R. Corwin, assignor to Frank B. Cook Company, Chicago, Ill. Line finder switches to connect a calling line to a manual operator respond when a receiver is lifted, and a master switch designates the next linefinder to be used.

1,173,773 and 1,173,777. Automatic Exchange. Issued to E. R. Corwin, assignor to Frank B. Cook Company, Chicago, Ill. Complete connecting units automatically pick up a calling line and automatically select a called line. A master switch designates the connecting unit to serve the call.

1,173,774. Telephone Timer. Issued to M. L. Johnson, assignor to Frank B. Cook Company, Chicago, Ill. In a switchboard where only a limited time of conversation is permited, a timing device connects a phonograph to the cord pair when the time limit has been reached.

1,173,775. Trunk Signal System. Issued to M. L. Johnson, assignor to Frank B. Cook Company, Chicago, Ill. In a manual trunking exchange, the A-operator selects a trunk and sends impulses to operate a number indicator in front of the B-operator who then connects the plug with the line of the number thus transmitted.

1,173,776. Branch Telephone System. Issued to E. R. Corwin, assignor to Frank B. Cook Company, Chicago, Ill. Some of the lines have limited service and are discriminated automatically to prevent connections to which they are not entitled.

1,174,187. Loading Coil. Issued to Thomas Shaw, assignor to American Telephone & Telegraph Company, New York, N. Y. A ring-core of four sections has the sections magnetically separated. The four wires of a phantom circuit are wound in eight windings upon the four sections, and the separation of the sections is varied to equalize the magnetic leakage in the coil.

1,174,262. Signal System. Issued to E. H. Martin, Webster City, Iowa, and T. H. Ferguson, Oak Park, Ill. To prevent the disconnect lamp from showing before the completion of a connection, a delay device is placed in the lamp circuit.

1,174,434 and 1,174,599. Coin System. Issued to G. E. Mueller, assignor to Kellogg Switchboard & Supply Company, Chicago, Ill. The calling telephone user deposits a coin in a position of suspense and the answering of the called telephone automatically passes the coin to the locked till of the coin box.

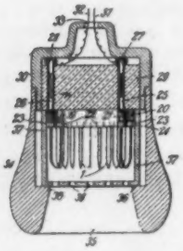
1,174,554. Thermal Telephone. Issued to Otto Fischer, Utrecht, Netherlands. A large number of fine wire loops, in multiple, give audible sounds when passing speech currents.

1,174,613. Head Receiver Equipment. Issued to Ernst Ruhmer, Berlin, Germany. The sound is not passed through the outer ear. The head band is worn close upon the skull and the vibration of the receiver diaphragm is communicated to the head band and thus to the skull and to the inner ear.

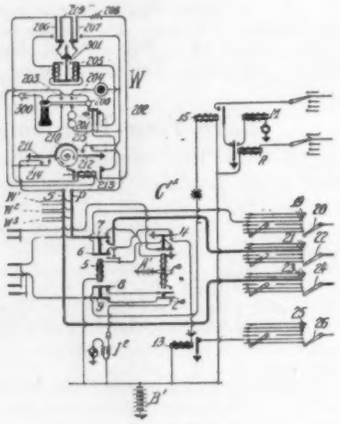
1,175,048. Transmitter. Issued to J. J. Comer, assignor to Automatic Enunciator Company, Chicago, Ill. Detail of construction of a granular-carbon transmitter.

1,175,104. Branch Exchange System. Issued to B. D. Willis, assignor to Automatic Electric Company, Chicago, Ill. A branch exchange telephone line passes through jack-points at the branch switchboard and extends to the main exchange so that the telephone may call main but be called by main or by branch.

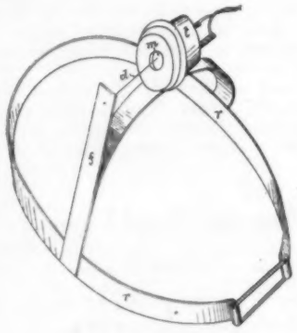
1,175,119. Automatic Switch Circuit. Issued to A. H. Blessing, assignor to Automatic Electric Company, Chicago, Ill. In a connector of the Strowger type, the first vertical movement closes the circuit of the rotary magnet, but the operation of the rotary magnet is delayed until the vertical impulses have ceased.



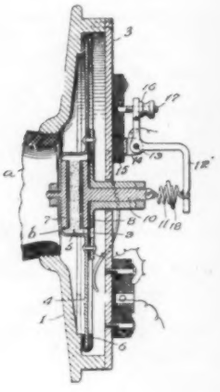
1,174,554.



1,174,599.



1,174,613.



1,176,725.

1,175,396. Meter System. Issued to G. D. Wolf, assignor to Kellogg Switchboard & Supply Company, Chicago, Ill. The cord pair of a manual switchboard has a meter for registering complete connections and a separate meter for registering calls not resulting in complete connections.

1,175,488. Switchboard System. Issued to Hubert S. Turner, San Diego, Calif. Instead of listening keys, contact plates upon the operator's hand make contact with exposed jack plates for listening and ringing.

1,175,579. Meter System for Automatic Exchange. Issued to F. Aldendorff, assignor to Western Electric Company, New York, N. Y. The answering of the called telephone line causes an initial movement of the meter but the full movement of the meter is not accomplished until release of the connection, which release is under control of the calling line. This registration may be defeated by a central office attendant if desired.

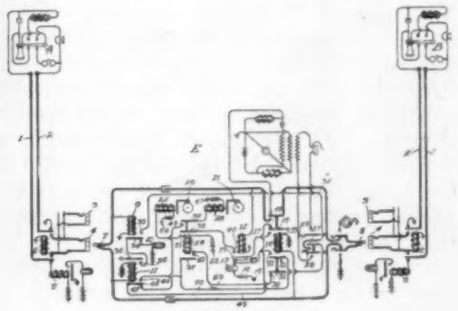
1,175,856. Call-Distributing System. Issued to B. D. Willis, assignor to First Trust and Savings Bank, trustee, Chicago, Ill.

(Application filed Oct. 5, 1906.) Incoming calls are distributed by automatic switches to service trunks which pass through several operators' positions, with a signal at each position. The first signal is displayed, and the operator has a key to pass the signal to the next position when overloaded.

1,176,260. Automatic System. Issued to C. S. Winston, assignor to Kellogg Switchboard & Supply Company, Chicago, Ill. The selecting switch is controlled by fast and slow relays, and the releasing circuits employ one of the magnets used in adjusting the switch selectively.

1,176,269. Repeater Circuit. Issued to A. H. Blessing, assignor to Automatic Electric Company, Chicago, Ill. The system is for repeating the callsender impulses in an automatic switchboard. The claims relate to the arrangement of shunts and condensers at the line relay of the repeating units.

1,176,470. Callsender. Issued to J. A. Kropp, assignor to Western Electric Company, New York, N. Y. The full directory number of an automatic telephone is set up by separate handles which send impulses as they return. A crank then is turned to wind a main spring. Each handle starts to return by a definite time interval after the preceding handle stops.



1,175,396.

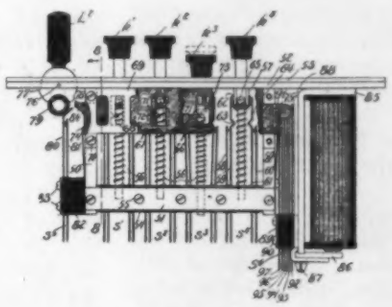
1,176,522. Portable Transmitter. Issued to C. L. Chisholm, Marysville, N. B., Canada, assignor to Chisholm Transmitter and Telephone Instruments Company. While each telephone set has a transmitter belonging to it, it has also a transmitter-jack and a portable transmitter with plug may be attached. This offers another solution for the problem of avoiding infection from the use of public transmitters.

1,176,715. Automatic System. Issued to T. G. Martin, assignor to First Trust & Savings Bank, trustee, Chicago, Ill. (Application filed August 17, 1906.) An arrangement in an automatic exchange whereby a central attendant may act through electrical circuits to release a telephone line from a trunk line.

1,176,716. Party-Line Automatic. Issued to E. A. Mellinger, assigned to First Trust & Savings Bank, trustee, Chicago, Ill. (Application filed July 7, 1907.) The busy test is taken off the calling line at the moment of testing to permit the calling telephone to call back upon its own line. Circuits are claimed for charging the cut-off relay in different ways according to the electrical condition of the connected lines.

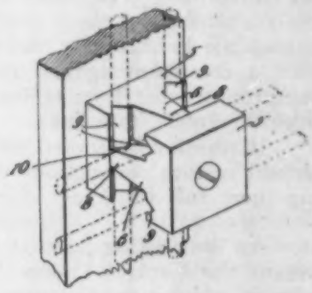
1,176,725. Transmitter. Issued to E. H. Amet, Redondo Beach, Calif. The back electrode is held by a spring which by its uniform tension keeps the electrodes at a uniform distance apart.

1,176,759. Key, Issued to William Kaisling, assignor to Kellogg Switchboard & Supply Company, Chicago, Ill. (Application filed March 7, 1907.) The key has a listening lever and several ringing buttons. Pressing a ringing button restores the listening lever. A magnet later partially restores the ringing button to stop ringing, but leaves it in an indicating position.



1,176,759.

1,176,801. Insulator. Issued to William H. Williams, Carey, O. Two porcelain blocks of the same shape are so designed that two wires may be held. A single screw is used.



1,176,801.

1,177,455. Party-Line Telephone. Issued to Harry Thompson, Baillieboro, South Monoghan, Ontario, Canada. The telephone is designed to prevent listening upon a busy line. Signals are sounded upon the line when the receiver is lifted, and a locking device prevents the operation of the hand generator until after the telltale signals have been given.

1,177,485. Party-Line Telephone. Issued to De Forrest Champeon, Houlton, Me. When the receiver is lifted, an electrical buzzer circuit is closed to give an audible signal upon the line.

Reissue 14,096. Automatic Trunking System. Issued to E. A. Mellinger, assignor to Automatic Electric Company, Chicago, Ill. Reissue of No. 1,110,071 dated September 8, 1914. The trunking system contemplates that two groups of subscribers shall have each a small group of trunks with a third group of trunks common to both groups of subscribers, and that a subscriber may not use a trunk of the third or overflow group unless all the trunks of his first group are busy.

Public Utility Commission News

Reports Concerning the Activities of State Regulating Bodies in the Telephone Field

Idaho

A SCHEDULE of rates previously passed upon by the commission governing telephone service in Orofino and Weippe, Ida., was filed with the commission by the Clearwater telephone lines. The schedule calls for a rate of $2 a month for business telephones; $1.50 a month for residence telephones, and $1 a month for rural service.

Illinois

The Public Utilities Commission authorizes the sale of the Automatic Telephone Company of Decatur to the American Telephone and Telegraph Company for $327,700.

The Public Utilities Commisison, after making a very careful investigation as to the appraisal of the telephone office, has given permission for the following rates in Moloqua:

	Per month.
Individual business telephone in village, metallic line	$2.25
Individual residence telephone in village, metallic line	1.75
Two-party residence telephone in village, metallic line	1.50
Rural party line telephone, grounded line	1.50

All the above rates, with the exception of the rural service subscribers, are subject to a discount of 25 cents per month, if paid at the company's office, on or before the fifteenth day of the current month, otherwise the rate will be as above.

The rate for rural service subscribers is subject to a discount of $1 if paid one year in advance.

F. C. Woods, general manager of the Galesburg Union Telephone Company, Wilfred Arnold, attorney for the company, held a joint meeting with the State Public Utilities Commission, the Farmington Exchange and the Galesburg Union Telephone Company.

This meting was held as the result of a complaint of the local company to the State Utilities Commission stating that the Farmington Exchange refused to allow them to connect with Farmington, thereby depriving Galesburg people of the Farmington service.

The whole trouble is said to have arisen from a misunderstanding which the Farmington company had with the Inter-State Telephone Company, over whose lines the Galesburg company reaches Farmington. This occurred last February. Officers of the local company then filed a complaint against the Farmington company on the grounds that they refused to receive their messages over the Inter-State lines.

It was finally settled that the Farmington company should restore connections with the local company, giving them full service.

An interesting case is that of the city of Peoria versus the Central Union Telephone Company of Illinois, in which a readjustment of rates is demanded, being heard before Commissioner Yates of the State Public Utilities Commission in Springfield. In support of its present rates the company had filed an inventory drawing its plant in Peoria to be valued at a little more than $1,500,000. It also showed that its profits per year were in the neighborhood of $40,000. Among the items listed were depreciation of $83,000 a year, and a "license" of $13,000 a year to the American Telephone and Telegraph Company.

The city attorney's attack on the license indicated that he had some information which was apparently a surprise to the representatives of the company. This "license" amounts to approximately $1 a year for each telephone in the city of Peoria. As there are nearly 300,000 telephones in the city of Chicago, a similar license would yield approximately the same sum.

A half a day was taken up in an effort to determine who really represented the Bell Telephone Company of Illinois. Major Tolman, former corporation counsel in the city of Chicago, said he appeared for the company. Mr. Martins, another attorney, said he was there in behalf of the receiver. Mr. Lynd said he was there for the company. Mr. Wilson of St. Louis also said he appeared for the company. An amusing contest resulted. Each attorney threatened the others with contempt proceedings and presented documents to show that the courts of Cook county had forbidden anybody else to appear. In the midst of this controversy Mr. Radley, attorney for the city, suggested that inasmuch as the defendant appeared to be without counsel, this would be a good time for him to take a default. The matter was finally settled by permitting Mr. Boynton, another attorney, to appear. This point settled, Commissioner Yates overruled the motion for a continuance of the hearing. In addition to a dozen attorneys present, there were fifteen or twenty auditors and accountants ready to rush into the breach.

Indiana

The Public Service Commission, in an order issued last month, authorized the proposed merger of the New Telephone Company, the New Long-Distance Telephone Company and the Indianapolis Telephone Company, the consolidated corporation to take the name of the latter company.

The three corporations have been operated practically as one concern and under one management. The bookkeeping and financing of the companies is simplified by the consolidation. The public is not directly concerned, the commission providing in its order that rates are not to be affected by the merger. The Indianapolis Telephone Company has operated the New Telephone Company since it leased that property in 1904. The New Long-Distance Telephone Company, with the same management as the other two corporations, has operated the long distance lines of the state.

In allowing the merger the service commission authorized the Indianapolis Telephone Company to issue preferred stock in the sum of $1,900,000, and common stock in the sum of $1,150,000, this stock to be used in canceling the securities of the other two corporations. The company will be required to pay $4,575 into the state treasury, credited to the service commission's expense fund, as a fee to be paid because of the stock issue.

"There can be no question but what the consolidation of these three corporations as an operating proposition is advisable," declares the commission. "By consolidating there will be but one set of officers and one set of books and one annual report to be made to this commission."

"The Indianapolis Telephone Company, created by the consolidation and merger of the said telephone companies," continues the order, "is hereby authorized to isue $1,900,000 par value of preferred stock and $1,150,000 of common stock and exchange the same for the stocks, common and preferred, of each and all of said telephone companies when, and upon the condition that all the stocks, common and preferred, of each of the telephone companies, to-wit, the New Telephone Company, the Indianapolis Telephone Company and the New Long-Distance Telephone Company, and $299,500 par value of the first mortgage bonds of the New Long-Distance Telephone Company and $44,000 par value of the first and consolidated mortgage bonds of the New Telephone Company, and $150,000 par value of the third mortgage bonds of the New Telephone Company are surrendered to the Indianapolis Telephone Company for cancellation and are canceled."

After stating that all legal requirements have been met by the merging corporations that are necessary to the action of the commission in approving or disapproving the merger agreement the commision discusses the capitalization question.

"The statute having placed the approval of the contract of merger and the oversight of the capitalization in the hands of this commission, it becomes of importance to inquire into the capitalization as proposed," states the commission. "The physical property of the New Telephone Company and of the Indianapolis Telephone Company constitute a single plant supplying service in Indianapolis and vicinity, and is considered here in the name of the Indianapolis Telephone Company. A valuation of that plant made by Mr. Cline, general manager and engineer of the company, was placed at $2,864,316.75. This includes the sum of $1,107,145 for such items as engineering superintendence, interest during construction, cost of obtaining contracts, or going value and items of that character other than the cost of labor and material in constructing the plant. We have not had an inventory of this plant or any of the properties of these

utilities made by our staff, but we have had the unit values used in this appraisal as applied to material and labor examined and compared by our staff, and those making the comparison have testified that in some instances they found the unit value higher than they would use, in some instances lower, but on the whole averaging fair, and we accept them for the purposes of this case. They have not attempted to compare the price of real estate, buildings or switchboards. Accepting the utility's price on these parts of the plant and the ones examined by our staff of the distributing system, we have on this plant the value of $1,757,171.75 for the physical properties without intangible values."

The merger petition had been pending before the commission since February 3. The petition was heard March 1.

Following an affidavit signed by Manager R. R. Scott, that the Farmers' Mutual Telephone Company, which is fighting in the Whitley Circuit Court to set aside an order of the public service commission to connect up its lines with those of the Whitley County Telephone Company, could not receive a fair judgment from Judge Wrigley, the latter has granted the Farmers' Mutual company a change of judges and appointed Hon. Dan Link, eminent jurist and judge of the DeKalb Circuit Court, to hear the case and the trial will be set for some date in the fall.

The Mutual company has a case pending in the state Supreme Court, on a former order, and is now fighting a second and amended order in the Whitley Circuit Court. They recently filed a complaint to enjoin the public service commission from carrying out the order for physical connection, which was to have gone into effect April 1 last.

Kansas

The Peoples Mutual Telephone Company has bought out the La Cygne Telephone Company at La Cygne, according to an application for an order approving the sale filed with the public utilities commission. And the first official act of the new owner is to ask an increase in rates. An application also was filed at the same time asking permission to charge 75 cents a month for party-line service, unless there are more than four telephones on the line, when the charge will be 50 cents. The old rate was 50 cents. Residence individual telephones are to be increased from 75 cents to $1 a month and business telephones from $1.50 to $2 a month.

The American Independent Telephone Company of Holton won its fight to charge all patrons the same rates. Under some old contracts, certain rural subscribers, who furnished part of the equipment, were getting lower switching rates than the other patrons of the company. After a hearing, the commission found that the contracts are illegal, unjust and discriminatory, and ordered that the company put in the same rates for all its subscribers.

An order also was issued providing for three minutes' free service for patrons of the American Independent between Holton and patrons of the exchanges at Mayetta, Whiting, Larkin, Denison, Netawaka and Circleville. After the first three minutes a charge of five cents a minute can be made.

Application of the Mutual Telephone Company of Esbon to increase local exchange rates was denied, on the ground that the company had not produced any evidence in support of its application. The company was authorized, however, to file the following schedule of toll rates to neighboring exchanges: Mankato and Bellaire, 10 cents; Smith Center, Cawker City and Glen Elder, 15 cents.

The United Telephone Company of Abilene was authorized to issue $14,000 worth of stock, the proceeds to be used to pay for the Stockton exchange, recently purchased by the United Telephone Company.

Gertrude E. Miller of Viola was authorized to fix the following toll rates for her Viola Telephone Company: To Clearwater and Garden Plain, first three minutes, 10 cents. W. E. Sweet was authorized to purchase the Udall Telephone Company from J. H. Sweet.

After hearing the requests of the Arkansas Valley Telephone Company of Great Bend for permission to issue $200,000 in common stock, the Genesee Telephone Company of Genesee and the Home Telephone Company of Ness City to increase their rates, the public utilities commission, Chairman J. L. Bristow and Member John M. Kinkel, reserved their decision until they can more fully go into details.

A grievance committee from the Kansas Independent Telephone Association is scheduled to appear before the members of the Kansas Public Utilities Commission. Dr. H. J. Close, secretary of the association, recently asked the commission to meet a committee from the Independents and "talk over matters." Members of the commission say they don't know exactly what is wrong, but suspect that the telephone men are objecting because the commission has refused a number of requests made recently for increased telephone rates. The commission has refused more applications for increased rates than it has allowed, and some of the Independents declare the commission has exceeded its authority in refusing to allow the increases asked for.

Three telephone orders were issued by the Public Utilities commission, and one complaint against a telephone company was dismissed without prejudice when the commission authorized the Emporia Telephone Company to issue $100,000 capital stock, to be sold at par. The proceeds are to be used to take up $100,000 worth of first-mortgage bonds.

Two sales of telephone exchanges were authorized. The Kansas Buff Brick and Manufacturing Company was granted permission to sell the plant at Buffville to the Altoona Telephone Company. W. W. Finney was authorized to sell his plant at Neosho Rapids to the Emporia Telephone Company. The complaint of W. P. Nossaman and A. M. Horner against the service furnished by the Cunningham Telephone Company was dismissed without prejudice at the request of the complainants.

Massachusetts

Without a dissenting voice the Committee on Mercantile Affairs voted to report adversely on two bills and the Public Service Commission's recommendation for an investigation of the New England Telephone and Telegraph Company and the American Telephone and Telegraph Company.

The report on the commission's recommendation, which asked for an appropriation of $25,000, will be given reference to the next General Court as "no legislation necessary." The two bills, filed with the petition

of the South Boston Trade Association, will be given "leave to withdraw."

Massachusetts stockholders of the American and New England Telephone and Telegraph companies have been urged to write to their representatives and senators asking them to oppose the resolve providing for an investigation of the two concerns by the Public Service Commission. The stockholders have received a letter signed by T. Jefferson Coolidge, Frederick Ayer, Alfred D. Foster, Gordon Abbott, J. Sumner Draper, Frank E. Dunbar, Wilmot R. Evans, A. Shuman, Charles E. Ware, Hugh Bancroft, George W. Mitton, Frederick P. Fish, W. W. Crapo, Frederic C. McDuffie, Philip Dexter, Charles W. Whittier, George S. Motley, E. J. Fabens, Henry Howard, William M. Wood, Allan Forbes, A. W. Damon.

The letter says:

The commission now have complete authority over rates and service, and all the present rates of the New England Telephone & Telegraph Company in this Commonwealth have been either fixed or approved by state authority. If the commission wish to provide themselves with further information pertinent to the consideration of questions of rates and service which may be presented to them we have no objection, but we do object to a public arraignment of these corporations such as apparently is proposed.

The subjects which the commission propose to investigate and control may conceivably present opportunities for differences of opinion, not only between the management and the commission, but also among all the commissions having supervision of the telephone companies in various states. The confusion and disorganization of the management's plans, as well as the time and expenses involved in such investigations of questions of business policy and operation, work serious injury to the corporations and carry no corresponding advantage to the subscriber, even assuming the judgment of the commission to be superior to that of the management.

The ultimate effect of this procedure will be injury to the credit of the corporations, to the service of the subscriber, and to the investment of the stockholder.

The American Telephone & Telegraph Company, a large part of the stock of which is distributed in this Commonwealth among 35,000 stockholders, is confronted with the burden of raising money for new construction at the rate of $500,000 every week in the year. In the past this has been accomplished without difficulty, and indeed new capital in twice this volume has for some time past been cheerfully contributed for this purpose. Other public service corporations meantime have suffered from impaired credit. Investors in their securities have met with loss, and the public has complained and is now complaining of their lack of facilities for proper service.

We believe therefore that we have every reason to protest against the subjection of the telephone corporations to investigation and additional regulation.

Maryland

Application was made to the Public Service Commission by the Chesapeake and Potomac Telephone Company to exercise franchises granted it by the mayor and City Council of Pocomoke City and Crisfield. The commission set the cases for hearing some time in May.

Michigan

Lawton T. Hemans, chairman of the state railroad commission, said, at the close of a recent hearing of the Michigan State Telephone Company's application for permission to install metered service in Detroit, that the commission probably would have to employ an expert to analyze the company's appraisal of its property.

This action, according to the chairman, if it becomes necessary, will be because the city refused to proceed with a defense it started against the proposed measured service.

"I'd like it understood plainly," said Commissioner Hemans, "that Detroit telephone users are not going to be treated unjustly because the city officially has refused to proceed against measured service on the ground that it is a matter purely of municipal control and not in the domain of the state railroad commission.

"The commission itself, on the refusal of the city do do so, will attempt to safeguard the interests of the telephone users in Detroit. To that end we may find it necessary to employ an expert to analyze the inventory and appraisal as submitted by the telephone company.

"This action will be necessary in the event that cross-examination fails to bring out everything that we believe it should."

In reply to a question, Commissioner Hemans said he did not expect that the commission would go so far as to order a new appraisal and inventory of the Michigan State Telephone Company's property in the Detroit metropolitan zone to be made under supervision of the state.

Thursday, Commissioner Hemans read into the record of the hearings an invitation for Detroit civic organizations to take up the protest against measured service that Corporation Counsel Harry J. Dingeman and Controller George Engel saw fit to drop.

No civic organization had accepted the invitation when the hearing was adjourned Friday afternoon.

It will be several weeks before the commission gives a decision, Commissioner Hemans said.

Montana

The public utilities commission will hold a hearing here June 1 on a petition from eastern Montana for the establishment of joint telegraph rates. At present, because the companies do not interchange business, messages are sent by a long, roundabout way between some points, whereas by a joint service in many instances they would be sent direct and the sender would pay only one instead of two local rates.

Nebraska

Discussion of action by the city commission of Omaha to force abolition of the 5-cent telephone toll to South Omaha ended in a decision to take no action. The matter has been pending for several months, following the merger of the cities, but the telephone company asserted that it could not abolish the toll charge without raising South Omaha telephone rates, which are now considerably lower than those in the rest of the greater city.

A dollar a year will be the increase on rural telephone rates on exchanges out of Prague, Weston, Malmo and Morse Bluffs, according to action of the railway commission.

Heretofore, says the commission, the company's telephones have been operated at a loss of more than $2 a year per station.

The state railway commission has notified O. R. McDaniel of the Woodlake Telephone Company that he must cease charging patrons 25 cents for switching toll messages to two farm lines connected with his exchange.

In addition to the toll charge to Woodlake it is said the additional charge of 25 cents is charged if the message is to be switched to either of two farm lines. The railway commission holds Mr. McDaniel's company responsible. It has failed to hear from him and has noti-

fied him that unless the practice complained of is stopped the matter will be placed in the hands of the attorney-general for prosecution.

The Interstate Commerce Commission has issued orders that monthly reports shall be filed with it by telegraph and telephone companies in regard to revenue, expenses and capital changes. The new order applies to companies whose gross revenue is in excess of $50,000 a year. This order will apply to the Bell company and the Lincoln Telephone and Telegraph Company or any other company that does an interstate business to the amount of $50,000 a year. Any company with which an interstate message originates or terminates is called an interstate company. The Nebraska Railway Commission requires annual reports from telephone and telegraph companies. The new order is an indication that the Interstate Commerce Commission is delving closer into the telephone and telegraph business.

The railway commission has issued an order permitting the Lincoln Telephone Company to increase its farm line switching rates out of Syracuse from 30 cents to 40 cents a month. The company asked leave to increase the rate to 50 cents. The commission struck from the company expense an item for casualty insurance on the ground that it was a theoretical expenditure and if actually expended would be spent to cover only such employes as are engaged in line work, yet the expenditure would be charged to the switchboard of the company.

Attorney C. Hartigan conferred with the state railway commission and withdrew a protest in the matter of proposed increase of rates which the Lincoln Telephone Company is asking leave to establish at its exchange in Fairbury. Mr. Hartigan represents J. A. Axtell. He will file another protest in place of the one now on file and will include in it all the added information asked for by the telephone company. The original filing of Mr. Axtell alleged that signatures to a petition agreeing to an increase in telephone rates were in many instances obtained by fraud. The company asked that the protestant be required to point out petitioners who were users of telephones who had signed an agreement and what misrepresentations had been made, and to whom. Attorney Hartigan will endeavor to furnish the particular kind of information the company desires. The state commission will then fix a date for a hearing to be held at Fairbury after the new protest is filed.

The state railway comission is preparing to adopt a rule that the charges shall begin at the telephone exchange to which the sender is connected. This rule has been in force to a considerable extent. Often disputes arise when the sender has free exchange over a part of the line over which a toll message is sent, the sender claiming that the toll charge should commence at the border of the free territory. In the case of all well-equipped telephone companies a toll message does not go over the free service wire, but over a separate toll line, and the commission will establish a rule holding that toll charges shall begin at the switchboard to which the subscriber is connected. The commission has given the Nebraska Telephone Company leave to cancel a combination charge in force at Vista and Macon. The charge was intended to cover the cost of messages sent part way by telephone and part by telegraph. The company intended to put this rate in general use, but it was applied to only two stations in Nebraska.

The Platte Valley Telephone Company of Scottsbluff has applied to the state railway commission for leave to issue $50,000 of additional stock, which, if granted, will make a total of $150,000. The application is signed by E. M. Morsman, attorney. In the past ten months the company has added 400 telephones, making a total of 2,306. The company reports that it spent $30,000 this year and $36,860 last year.

An increase of 25 to 75 cents per month in telephone rates at Springview, Keya Paha county, has been allowed by the state railway commission, as asked for by the telephone company. The order is by Commissioner Taylor and is concurred in by the other members. The advanced rates become effective on June 1.

A feature of his finding is that it authorizes the telephone company at Springview to charge 10 cents on each call on a rural line where the person talking is not a regular subscriber. The new rates are as follows:

Business, $2, an increase of 75 cents; residence, $1.25, an increase of 25 cents; farm line, $1.50, an increase of 50 cents; switching farm lines, 40 cents, an increase of 15 cents.

New York

The opening of the up-state Public Service Commission's investigation into short-term telephone contracts and cancellation charges at Albany resulted in an offer from the Bell telephone companies, which, if accepted by the commission, will cut in two the present charges for such telephone service, of which the commission has received complaints from places in various parts of the state. The Federal Telephone Company admitted, as did the Bell companies, that the present scale was unsatisfactory to both company and consumer, and both companies will within the coming week submit a written tariff schedule cutting in half these short-term rates.

In the schedules of the Bell companies the present maximum charge for discontinuance of telephone service in less than one year ranges as high as $17. Under the schedule suggested today the highest charge for cancellation in less than a year will be $5.50. This will apply to all the ordinary direct, two and four party lines, with an addition of half the proposed disconnection charge for extension stations.

Telephones will be installed at the scheduled rates on the basis of a year's contract. But, should the subscriber wish to give up the service in less than a year, he will be charged $5.50 to disconnect his telephone if he has been using it but one month, $5 if it has been in two months, and so on, with a reduction in the disconnection charge of fifty cents for each month during which he continues the service, until the charge will be but fifty cents for disconnection at the end of eleven months and no charge at all for cancellation at the end of the year.

The representatives of the Federal company said that while they would make a reduction from their present scale, they would prefer to make the reduction proportionate to the rates paid.

The commission announced that it would carefully consider these propositions when they are formally submitted in writing, and intimated that if the schedules took care of all the situations that might arise, judging by the complaints that have been filed, the scheme would be approved of. The telephone company experts said that these reductions would apply to 98 per cent of its business in short-term contracts. They

said that the proposed charge was less than the cost of the work actually involved in disconnections.

Commissioner Irvine, who has had several of the previous complaints of this sort in charge, presided at the hearing and all of the commissioners were present.

R. V. Marye represented the Bell companies, with A. D. Welsh, commercial engineer, and C. Ewing of Buffalo, an engineer, represented the Federal companies. The commission indicated its anxiety to close the matter up before the summer season, when most short-term contracts are made, begins.

As a result of an order adopted by the Public Service Commission the New York Telephone Company will immediately begin to install slot machine telephones in all subway stations.

The order applies only to the present subways, but it was said at the offices of the commission that when the new subway lines are in operation the order will be modified to include all lines. Commissioner Hodge said that the installation of telephones in the subway stations would serve a great public demand.

The New York Telephone Company has filed with the Public Service Commission a schedule of its new rates between Freeport and Garden City, including the village of Mineola. The new rates are the result of a compromise entered into between the telephone company and Counselor Elvin N. Edwards on behalf of C. A. Edwards, the complainant. The reduction makes difference of 5 cents to the subscriber and to the public between the points named, the rate heretofore having been 10 cents to the subscriber from Freeport to the Garden City central, which includes Mineola, and 15 cents to the public. The new rates are 5 cents to the subscriber and 10 cents to the public.

North Dakota

The first annual reports to be turned in to the state railroad commission by the various telephone companies operating in the state are being received daily. Every company in the state must file a report, whether a farmers' line or a stock company.

The commission will gather statistics and data from the reports which will later be used in regulating telephone tolls throughout the state.

Ohio

In the matter of the application of the Home Telephone Company of Ironton, County of Lawrence, Ohio, and of Central Union Telephone Company for the consent and approval of the commission for the purchase of certain property of the Central Union Telephone Company by the Home Telephone Company, and for a connecting arrangement for an interchange of service between applicants, the Public Utilities Commission of Ohio finds that:

"This matter coming on this day for further consideration upon that part of the joint application herein asking the commission's consent to and approval of the sale and conveyance by the Central Union Telephone Company and its duly appointed receivers, of its property within the exchange area of Ironton, Ohio, and the purchase and acquisition thereof by the Home Telephone Company of Ironton, Ohio, and the Public Utilities Commission of Ohio coming now to value the property of the said Central Union Telephone Company and said the Home Telephone Company used and useful for the service and convenience of the public in furnishing telephone service in the exchange area of the city of Ironton, Ohio, and after considering the inventories and valuations of said properties submitted by applicants, the independent inventories and valuations made by this commission, the evidence and exhibits, and being fully advised in the premises, the commission finds and ascertains the value of the several classes and kinds of property of the Central Union Telephone Company and its receivers, David R. Forgan, Edgar S. Bloom and Frank F. Fowle, and of the property of said the Home Telephone Company, within the exchange area of Ironton, Ohio, and the property of said utilities as a whole, used and useful for the service and convenience of the public in furnishing telephone service in the exchange area of Ironton, Ohio, as of October 1, 1915. It is, therefore,

"Ordered, That notice of such valuation placed upon the several kinds and classes of property of the said Central Union Telephone Company, David R. Forgan, Edgar S. Bloom and Frank F. Fowle, receivers, and of the Home Telephone Company of Ironton, Ohio, within the exchange area of Ironton, Ohio, and upon said property as a whole, as herein summarized and set forth, be transmitted by registered letter to said utilities and to the mayor of the city of Ironton, Ohio, all as provided for under section 499-16 of the General Code of Ohio. It is further

"Ordered, That all inventories, valuations, transcripts and exhibits be filed and considered as a part of the record herein. It is further

"Ordered, That the commission reserve the right, in the event it shall determine the aforesaid inventory to be incomplete or inaccurate, or that said valuation is incorrect, to make such changes therein as may be necessary before said tentative valuation shall become final."

F. M. Stevens has again appeared before the City of Elyria Council to urge that action be taken toward allowing the Elyria Telephone Company to place its wires underground in the congested district. They concluded not to do so at present, on account of the hearing before the state utilities commission regarding the readjustment of rates in the city. A letter will be sent to headquarters asking when the hearing will be held.

The Cleveland Telephone Company Saturday was authorized by the state utilities commission to issue $2,000,000 worth of capital stock and $3,000,000 worth of four-year 5 per cent notes. The proceeds of the sale of the stock is to be used to discharge $2,000,000 in refunding notes, which mature May 16.

The proceeds of the sale of $1,790,000 worth in notes are to be used to refund the others that matured May 16. The balance of the $3,000,000 is to be expended in improving the Cleveland service by means of constructing new stations and offices and increasing the equipment.

Chief among the improvements is the construction of a new exchange at Cedar avenue and Edgewood road to be known as the Fairmount exchange, at a cost of $70,000, and the construction of a new office at Lorain avenue and One Hundred and Third street to be known as the Lorain exchange.

The sum of $506,400 is to be spent in the construction of underground cables and $218,400 is to be spent in the construction of new aerial cables. Other new equipment is to cost $77,000.

Oregon

Petitions asking for an increase of its rates at Coquille and Myrtle Point, and also for an increase in the rates for conversations between the two towns have been filed with the public service commission of Oregon by the Coos & Curry Telephone Company, which recently acquired the Coquille Valley Telephone Company's lines.

The new rates asked for both towns are: One-party business, $3; two-party, $2.50; four-party, $2.25; residence, one-party, $2.50; two-party, $2; four-party, $1.75; desk, 25 cents extra; extension, $1 per month; business, 60 cents.

The company asks that its flat rate of 10 cents per conversation be increased to 10 cents for the first minute and a half and 5 cents for each succeeding minute for all subscribers as well as non-subscribers.

Washington

That $19,382,200 is a just, fair and reasonable amount on which the Pacific Telephone and Telegraph Company is entitled to earn a return in Washington on its investment here based on the "actual performance appraisal" of the company, is the finding made as to the value of the company for rate-making purposes by the state public service commission in its "opinion and findings of fact" made public in Olympia last month. The company engineers fixed the "actual performance and appraisal" at $19,246,088 and the total "reproduction cost," including the development cost, at $26,892,700.

The adoption of the "actual performance method" of appraisal is a question on which the commissioners themselves could not agree, Commissioner A. A. Lewis dissenting from the majority report on this point. Chairman Charles A. Reynolds wrote the majority decision, which is also signed by Commissioner Frank R. Spinning. Commissioner Lewis in his dissent says:

"While the 'actual performance' method of appraisal as used by the respondent has commendable features, I am not prepared to adopt it at this time as a principle without a more careful study of the application of the method to the future work of this commission. I therefore concur only in the findings of fact and result which are based on the statutory requirements."

The determination of the value of the telephone property is important for the reason that the figure found by the commision will be used as the "rate base" when the hearing comes on next month relative to fixing telephone rates in the state of Washington. The present action was instiuted by the commission itself, which is the complainant in the action.

Wisconsin

W. J. Gallon, secretary of the Wisconsin State Telephone Association, is sending a petition to the railroad commission, which will ask that the commission order a statewide increase in telephone rates of twenty-five cents a month. A resolution to this effect was adopted by the state telephone association in recent convention. The resolution has already been filed with the railroad commission.

The Magenta Telephone Company, Seymour, Eau Claire county, was granted a certificate today by the railroad commission. The new company will operate in Seymour only and will be connected with the service of the Wisconsin Telephone Company. Henry Kurth, Seymour, is secretary and treasurer of the company.

There is a possibility that the Wisconsin Telephone Company may appeal from the order of the railroad commission reducing ten of the main sixteen classifications of rates, according to H. O. Seymour, general manager of the company. City Attorney Clifton Williams has engaged Max Schoetz, former assistant city attorney, and now of the faculty of the Marquette University law school, to analyze the report of the commission. The reduced rates will go into effect July 1.

Interstate Commerce Commission

Section 10 of the said act bcomes operative October 15, 1916. This section provides that in the cases specified therein purchases shall be made from or dealings had with

> "the bidder whose bid is the most favorable to such common carrier, to be ascertained by competitive bidding under regulations to be prescribed by rule or otherwise by the Interstate Commerce Commission."

A tentative draft of rules to govern such bidding and the reports to be made in connection therewith has been prepared as a basis for discussion. In order that the commission may have the benefit of the views of carriers and others interested in the administration of the said section, the above-mentioned matter and other features have been set for hearing at 10:30 a. m., in the hearing room of the commission at Washington, D. C., on June 19, 1916. Persons who cannot appear or be represented at this hearing may submit their views in writing on or before that date.

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of TELEPHONE ENGINEER, published monthly, at Chicago, Ill., for April 1, 1916.

State of Illinois, County of Cook, ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Ed J. Mock, who, having been duly sworn according to law, deposes and says that he is the Business Manager of TELEPHONE ENGINEER, and that the following is, to the best of his knowledge and belief, a true statement of the ownership and management of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, ELECTRICITY MAGAZINE CORPORATION, 1251-1256 Monadnock Bldg., Chicago.

Editor, PAUL H. WOODRUFF 7025 Yale Ave., Chicago, Ill.

Managing Editor and Business Manager, ED J. MOCK, 9345 Pleasant Ave., Chicago, Ill.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

ED. J. MOCK - - - - 9345 Pleasant Ave., Chicago, Ill.
B. C. SAMMONS - - - - - - - - Blue Island, Ill.
JOHN CROCKER - - - - - - - - - Morea, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: There are no bonds, mortgages or other securities outstanding against TELEPHONE ENGINEER.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

ED J. MOCK, *Business Manager.*

Sworn to and subscribed before me this 30th day of March, 1916.

(Seal) LEONA J. EKSTROM.

My commission expires Aug. 17, 1917.

Preservative Treatment of Poles

Presented Before the American Institute of Electrical Engineers

BY F. L. RHODES AND R. F. HOSFORD

The results of an experience with treated poles over a period of 18 years have been analyzed. Data are given for poles treated by pressure, open tank, and brush methods. The relation of these methods of treatment to the conditions which have determined the choice of pole timbers in the United States is outlined. The experience with brush treatments has reached a more advanced stage than that with the other types of treatment and is consequently discussed in greater detail. Rates of decay, increase in life by treatment, the effect of seasoning, and the characteristics of the damage to poles caused by decay and by insects are all covered.

THIS PAPER sets forth results that have been reached in the plant of the American Telephone and Telegraph Company and associated companies through the use of distillates of coal tar or of wood tar for the preservative treatment of wooden poles. The experience reported covers several typical processes for applying the preservative, which will serve to show the varied possibilities attainable through the choice of methods for applying the class of materials studied.

The methods employed for studying these typical processes have consisted mainly in the installation of experimental series of poles to form parts of lines used for regular service. After exposure of these experimental groups of poles for a time sufficient to allow of the beginning of changes in their condition, they have been subjected to regular and systematic inspections. Except in the case of the experiments with creosoted pine, it has been the practice to include, in each experimental series, untreated poles in sufficient number to afford a definite basis for conclusions as to the effects of the preservative methods. Untreated pine was known to yield such a short life under the conditions to which creosoted pine poles were exposed that a comparative determination of its life would not possess any practical value.

The bulk of the pole supply in this country has been drawn from three varieties of timber; two species of cedar and one of chestnut. All of these timbers show considerable resistance to decay when exposed in contact with soils. Being available in sizes suited for pole construction in much larger quantities than other species which also possess this desirable characteristic, the market supply for many years has consisted mainly of these three species. As many other species possess all of the other characteristics desirable in a pole timber (such as strength, available quantity, etc.) and as cedar and chestnut are not so distributed as to be locally available in all sections of this country, it is, of course, often desired to know what can be done with species grown in the immediate neighborhood of lines to be built.

Southern pine is a timber available in large quantities in regions at a considerable distance from supplies of cedar or chestnut. In the territory to which it is native, it is neither durable in the ground nor above it. It possesses, however, in good measure, all of the other qualities desired in a pole timber. Timbers deficient in durability both in the ground and above it, require, necessarily, the application of preservative throughout their entire length. This requirement favors the use, for their treatment, of the cylinder pressure process. This process was one of the earliest of preservative processes to be established upon a commercial basis, and is today, the most prominent in the field with respect to number of plants and volume of business. Historically, the longest experience which we have to report was obtained with Southern pine treated by this process. The results obtained with these Southern pine poles, impregnated with creosote by the cylinder pressure process, will serve to illustrate the possibilities of what we shall hereafter refer to as *whole length treatment.*

We have already referred to durability, when exposed in the ground, as an important characteristic for a pole timber. It is the general experience that the part of the pole which is placed in the ground is the least durable section, even in the case of species which are ranked as the most durable pole timbers. In most soils, the section of the pole lying between a plane a few inches above and a plane one to two feet below the surface of the ground, which we shall hereafter term the *ground line section,* is found to suffer much more from decay than any other part of the pole. In a few soils, this region of maximum decay extends to greater depths in the ground; occasionally even to the butt end of the pole. An observation of the condition of the *ground line section* can, however, be depended upon, in the case of timbers of the relatively durable class, to show the deterioration of a pole due to decay, except as defects were originally present in other sections of the pole.

The first work devoted to retarding deterioration in the ground line section of poles made from durable species of timber consisted in applying preservative to the surface of this section with a brush. This process has been generally known as the *brush treatment* and it is fortunate that this name was early applied to it, as both its technique and its aims are different from those of the ordinary processes of painting. The brush treatment is an inexpensive process and requires no plant and but few tools for its application. Although the slight penetration of the preservative attainable by this process has always been recognized as limiting its effect in retarding decay when compared with processes forcing the preservative to enter deeply into the wood, its other characteristics have made it the most widely used of all pole treating processes. Three experimental series of poles located respectively in Georgia, Northern New York, and Nebraska, will furnish data relating to this process.

The comparatively small gain in life anticipated from the brush treatment led, at the time when the experiments which we are to describe were begun, to the inclusion of poles treated by the *open tank process.* This process, while then new in its application to poles, had long been employed in some of its varied forms for treating other timber products. It has never been extensively employed for whole length treatment, but possesses considerable advantages for part length treatments. When applied to the butt sections of cedar and chestnut poles it can be made to give a much greater penetration than the brush treatment. As penetration is generally agreed to be, to some extent, a measure of preservative efficiency, it was expected that the open tank treatment would show a greater increase in life than the brush treatment. Two

experimental series, located in Northern New York and Nebraska, are reported on for this treatment, and it will be seen that the expectations of improvement over the brush treatment are being justified.

WHOLE LENGTH TREATMENTS.

Washington-Norfolk Line.—This pole line of the American Telephone and Telegraph Company, extending from Washington, D. C., to Norfolk, Va., was built during the summer and fall of 1897. For some twenty miles south of Washington chestnut poles were used; for the rest of the line creosoted pine poles and guy stubs to the number of 9975 were installed. Most of the poles were sawn to fixed dimensions, 9555 being of square and 13 of octagonal cross-section. The remaining 407 pieces were natural round poles.

These poles were specified to be impregnated by the cylinder pressure process with not less than twelve pounds of dead oil of coal tar per cubic foot of timber. The treating operations were carefully and continuously inspected by company employees. Frequent tests were made of the dead oil of coal tar as the work of preparing these poles progressed.

Representative short sections of the line were inspected in 1903, about 300 poles being examined. No appreciable impairment was found. In 1908, the first regular maintenance inspection of the line was made and 14 square and 3 round poles were removed on account of decay. The total removals for decay prior to 1908 amounted to 4 poles. On December 1, 1914, the number of poles removed for decay had risen to 39 or about 0.4 per cent of the number originally installed. Table I gives in summary all pole changes occurring in the creosoted section of the Washington-Norfolk line and their causes.

In December, 1914, the current condition of the creosoted poles was studied by making a thorough and detailed inspection of a little over 1600 poles. Sections of from 89 to 312 poles were chosen at different points throughout the line so as to secure representative data on its condition. Special care was taken to cover sections adjacent to previous removals for decay. The results of this inspection are set forth in Table II, where data relative to the soil conditions surrounding all poles inspected are given, as well as the results specifically bearing upon poles found to show signs of decay. In Table III, the results of this inspection are combined with the records of prior experience for the sections of line examined.

It will be noticed from Table II that the cause of deterioration for 36 of the 42 poles showing decay in the top section was the cutting off of the top. Signs that the top had been cut off were found on only 21 sound poles, so that cutting off the top after treatment caused deterioration on 62 per cent of the poles concerned. Decay in the top section has not as yet caused any great reduction in the strength of the poles, as all show over 65 per cent of their original strength. These results serve to emphasize, however, the rule which is one of the axioms of good treating practice, viz., that all timber should be completely framed before treatment.

It will be seen that comparisons of the soil data relating to moisture, altitude, and proximate composition give no indication that any variation in these characteristics is favorable to decay. Perhaps this is because only relatively few poles have as yet become unsound, since some apparent effects of soil differences will be noticed in the pole line next to be discussed.

From the section of Table II summarizing the external appearance of the poles examined, it will be seen that the bleached and the other lighter colored poles yield a percentage of decayed specimens considerably above the average for all poles inspected. Sixty per cent of the poles showing decay in the ground line section are "light" or "well bleached" as against twenty-three per cent of the sound poles. Fifty-seven per cent of the poles classed as "well bleached" show signs of decay as against 1.5 per cent of the poles contained in the "dark" group at the other end of the color scale. Poles showing decay

TABLE I.—EXPERIENCE TO DECEMBER 1914.
NUMBER CREOSOTED POLES INSTALLED 9975.

Cause of reconstruction	No. of poles dealt with	Per cent of total poles exposed
Highway or railroad construction, rerouting of line, etc.	157	1 57
Decay	40	0 40
Damage by storm or accident	3	0 03
Damage by fire	2	0 02
For analysis of preservative	6	0 06
Cause unknown	36	0 36
Total	244	2 44

TABLE III.—RESULTS OF 1914 INSPECTION COMBINED WITH PRIOR EXPERIENCE

Total poles inspected	1,696	
No. of original poles found	1,614*	
No. of poles previously removed for decay	26	1.5%
No. of poles in line decayed to point of reconstruction	20	1.2%
Total No. of poles decayed to point of reconstruction	46	2 7%
No. of poles showing decay only at top	42	2.5%
No. of poles now in line and showing decay	147	8.7%
Total No. of poles which have shown decay to date	173	10.2%

*Poles were removed from inspected sections to December, 1914, for the following causes:

Cause of Reconstruction	No. of poles dealt with
Highway or railroad construction, rerouting of line, etc.	43
For analysis of preservative	5
Cause unknown,	8
Decay,	26

TABLE II.—RESULT OF INSPECTION OF DECEMBER, 1914. (Restricted to Data for Original Poles remaining in the Line.)

Classification with respect to decay	No. of pieces	Per cent of poles inspected	Color of pole					Character of Surroundings: Soil moisture			Altitude		Soil composition							Cause of entrance of decay (when determinable)								Condition of pole with respect to strength		
			Dark	Medium dark	Medium light	Light	Well bleached	In water	Moist	Dry	Low	High	Sand	Loam	Clay	Sandy clay	Sandy loam	Clay loam	Sand and gravel	Check	Shake	Brittle	Auger hole	Knots	Insect hole	Adhering inner bark	Cutting top	65 to 100 per cent	25 to 65 per cent	Less than 25 per cent
Poles decayed at ground line	105	6 5	1	17	24	38	25	2	14	89	25	80	21	1	4	62	10	7	..	39	5	2	1	1	1	1	..	52	33	20
Poles decayed at top	42	2 6	7	16	12	6	1	1	9	32	11	31	3	3	..	29	4	3	..	..	..	..	..	1	..	..	36	42	..	..
Total poles showing decay	147	9 1	8	33	36	44	26	3	23	121	36	111	24	4	4	91	14	10	..	39	5	2	1	2	1	1	36	94	33	20
Poles sound	1,467	90 9	61	439	625	323	19	11	188	1,268	284	1,183	290	30	47	754	240	92	14	..	..	..	..	..	..	..	..	..	..	..

at the top have been omitted from these comparisons as their deterioration is almost entirely due to the cause already discussed. The lighter colored poles are presumably those which retain the lesser amounts of preservative, so that their predominance with respect to decay suggests that life will increase with the amount of preservative applied.

Observations which it is not practicable to present in tabular form indicated that the predominant manner in which decay began in the poles of square cross-section consisted in an attack near the center of one side. The shaping of the poles exposed the heartwood in the central part of each side at the ground line section. Practically all the checking noticed was confined to this exposed heartwood. The combination of the tendency to check with the slighter penetration which can be obtained in heartwood would seem to account for the predominance of this form of decay.

Montgomery-New Orleans Line.—This pole line of the American Telephone and Telegraph Company extending from Montgomery, Ala., to New Orleans, La., was built in the summer and fall of 1899. From Montgomery to Hurricane, Ala., chestnut and juniper poles were installed. Between Hurricane and New Orleans creosoted round yellow pine poles were used in its construction, a total of 7644 pieces being placed. The nature of the country traversed made it necessary to install an unusually large proportion of these in the form of *A, H* and tripod fixtures.

All poles were specified to be impregnated by the cylinder pressure process with not less than twelve pounds of dead oil of coal tar per cubic foot of timber. The treating operations were carefully and continuously inspected by company employees. Frequent tests were made of the dead oil of coal tar as the work of preparing these poles progressed.

Representative sections of the line were inspected in 1906, some 2152 pieces being examined. Each pole, stub, brace or pile employed as part of a fixture was inspected as a separate piece, as a considerable number of the different types of fixtures referred to above were encountered in the sections covered. The results of this inspection are summarized in Table IV.

A second inspection of the line was made early in 1915. The detailed records of the 1906 inspection were not available, so that a new choice of sections representative of the line had to be made. It is known that part of the poles examined were also examined in 1906 but it is not possible to compare their condition at the two periods.

The pole changes occurring in the creosoted section of the Montgomery-New Orleans line, up to the time when the last inspection was begun, are set forth in Table V. The causes for the changes are also given in this table. It will be noticed that removals made on account of decay amounted to only 0.3 per cent of the poles installed, although it must be noted that some of the poles included in the group whose cause of removal is unknown were probably removed on account of decay.

Table VI gives in summary the results obtained in the inspection of 1915. Nine sections of line were examined in the 1915 inspection. These sections were chosen so as to be representative of the different types of country through which the line passes. The number of pieces included in a section ranged from 150 to 228. In Table VII the results of the 1915 inspection are combined with the records of prior experience for the sections of line examined. It will be noticed that the data indicate

DATA ON THE CREOSOTED YELLOW PINE POLES IN THE MONTGOMERY-NEW ORLEANS LINE Poles Installed 1899

TABLE IV.—RESULTS OF INSPECTION, NOVEMBER, DECEMBER, 1906.

Classification as to condition	Slightly decayed	Badly decayed	Season checked and outer shell loosened	Slightly burned	Badly burned	Struck by lightning	Hollow heart at top	Eaten by insects	Woodpecker holes	Total No. pieces in class	Per cent in class	Per cent showing decay
Sound, free from defects	..	..	..	..	..	..	..	..	..	1,936	90	...
Slightly deteriorated, still serviceable	138	..	29	11	..	11	3	1	1	194	9.0	6.4
Badly deteriorated, should be replaced	..	19	..	..	3	..	..	..	..	22	1.0	0.9
Totals										2,152		7.3

TABLE V.—EXPERIENCE TO 1915.
Number Creosoted Pieces Installed—7,644.

Cause of reconstruction	No. of pieces dealt with	Per cent of total pieces exposed
(1) Highway or railroad construction, rerouting of line, etc.	126	1.65
(2) Damage by storm or accident	97	1.27
(3) Decay	22	0.29
(4) Damage by fire	11	0.14
(5) For analysis of preservative	1	0.01
(6) Cause unknown	76	0.99
Totals	333	4.35

TABLE VI.—RESULTS OF INSPECTION—JANUARY TO MARCH, 1915.
(Restricted to Data for Original Poles Remaining in the Line.)

Classification with respect to decay	No. of pieces	Per cent of pieces inspected	Color of pole: Dark	Medium dark	Medium light	Light	Well bleached	Condition as to tar: None	Caked at ground	Streaked near ground	Streaked ground to top	Soil moisture: In water	Moist	Dry	Altitude: Low	High	Character of surroundings: Muck	Sand	Soil composition: Sandy clay	Sandy loam	Loam	Clay	Clay and loam
Pieces showing decay	509	32.7	3	65	283	141	17	125	137	141	106	94	89	326	217	292	85	192	51	77	26	9	69
Pieces sound	1,049	67.3	20	283	530	203	13	95	141	317	496	256	312	481	629	420	358	331	127	123	26	7	76

Classification with respect to decay	Cause of entrance of decay (When determinable): Check	Shake	Axe cut	Auger hole	Knot	Bolt hole	Old insect hole	Bruise	Insects in poles: Ants: Woodpecker hole	White	Carpenter	*Small black	*Red	Borers: Marine (xylotrya)	Wharf borer (Nacerites melanura)	Flat head (chalcophora)	(Micromalthus debilis)*	Powder post (bostrichid)	(Tenebrio)*	Round head (Typocerus velutinus)	Condition of piece with respect to strength: 100 to 80 per cent	80 to 65 per cent	65 to 35 per cent	35 to 5 per cent	5 to 0 per cent
Pieces showing decay	143	60	5	5	4	1	2	2	1	242	33	72	9	9	1	4	3	5	1	50	39	262	133	65	10
Pieces sound	...	..	..	..	..	..	..	..	..	...	..	..	..	..	..	..	..	..	..	..	..	....	....	..	..

*This insect does not work in sound wood.

that in 1906, seven years after the line was built, about one per cent of the poles had deteriorated to an extent calling for reconstruction. In 1915, about 15½ years after the line was completed, the number of poles which had reached a point requiring reconstruction was probably about 5 per cent of the number installed. A little over 7 per cent of the poles showed signs of deterioration in 1906, while in 1915, the percentage showing signs of deterioration had risen to 33.

TABLE VII.—RESULTS OF 1915 INSPECTION.
Combined with Prior Experience.

		Pct.
Total pieces inspected	1,598	
No. of original pieces found	1,558*	
No. of pieces previously removed for decay	9	0.6
No. of pieces in line decayed to point of reconstruction	75	4.7
Total No. of pieces decayed to point of reconstruction	84	5.3
No. of pieces now in line showing decay or insect attack	509	32.0
Total No. pieces showing decay or insect attack to date	518	32.4

*Poles removed from inspected sections prior to Dec., 1914, for following causes.

Cause of Reconstruction	No. of poles dealt with
Highway or railroad construction, rerouting, etc.	15
Decay	9
Damage by storm	8
Damage by fire	7
Analysis of preservative	1

It will be seen from comparisons of the soil data relating to moisture, altitude, and proximate composition, that the surroundings of the poles had some influence upon the beginning of decay. The proportion of decayed poles located in soils classed as dry is above the average. The difference in altitude along the route followed by this line is not great, but it will be noticed that the locations classed as high had more than the normal proportion of decayed poles. Corresponding to these two indications it will be found from the data relating to soil composition that the lowest proportion of decayed poles was located in muck, which would necessarily be found in low, moist situations, whereas clay and loam, which would be found mainly in the higher and drier locations, show more than average percentages of decayed poles.

From the section of Table VI, summarizing the external appearance of the poles, it will be seen that the bleached and other lighter colored poles yield a percentage of decayed specimens considerably above the average for all poles inspected. For example, 57 per cent of the poles classified as "well bleached" were found to be decayed, as against 13 per cent of the poles classed as "dark."

The condition of the pole with respect to adhering tar also was found to offer distinctions in resistance to decay. Fifty per cent of the poles showing no tar were decayed, as against 39 per cent decayed among poles showing streaks of tar near the ground line, and 18 per cent decayed for poles streaked with tar throughout their length.

The lighter colored poles, and the poles carrying little or no tar, are presumably those which originally contained less than the average amount of preservative, so that their greater tendency to decay reinforces the conclusion that life will increase with the amount of preservative applied.

The cause for the entrance of decay was recorded in the case of poles which had not deteriorated to an extent sufficient to render such a determination impossible. It will be seen from the data relating to this subject, summarized in Table VI, that "checks" and "shakes" were the only important causes for the entrance of decay noted.

It will be noticed that insects were present in a considerable proportion of the decayed poles. While ants (termites) were found in 47 per cent of the poles injured by decay and in practically every case this insect contributed to the injury. Round headed borers were found in about 10 per cent of the poles. These insects also are responsible for some injury to poles. Marine borers were likewise found on about 10 per cent of the decayed poles located in water. The other insect forms reported do not seem to be responsible for any damage to the pole, but probably entered the pole after decay had made cavities in the wood. Whether the white ants and the round headed borers produced the initial injury to the pole structure in any case was not determinable. Large checks were noted in 5 per cent of the sound poles and 30 per cent of the decayed poles. Forty per cent of the poles attacked by white ants contained large checks. This would suggest that the entrance of the white ants was to some extent aided by breaks in the external layers of impregnated wood, but we have not as yet been able to reach any conclusive determination upon this point.

Retention of Preservative by Poles.—Evidence has already been brought out in discussing the results of inspections of creosoted pole lines indicating that the tendency of the creosoted pole to decay is dependent to some extent upon the quantity of preservative which it contains. Creosoted poles have to be prepared in large batches. The amount of oil used for impregnating a cylinder charge is readily determinable, but such a determination affords no means for ascertaining whether all of the poles treated at the same time receive equal shares of the preservative. Measurements of penetration upon individual poles are of some assistance in bringing the minimum impregnation nearer to the average, but the variations in the thickness of the sapwood layer in the different trees interferes with a requirement for uniform depth of penetration. Since some control can be exercised over the impregnation of the individual pole, and since there is some reason to believe that the presence of at least a minimum amount of preservative is needed for the prevention of decay, information bearing on the retention of the preservative by poles in service possesses much practical interest. Changes which the oil used for impregnating a pole undergoes during the period of service also have an important bearing upon the choice of preservatives.

It has been found possible to extract dead oil of coal tar from treated timber without appreciable contamination from the resins and oily substances which may be present as normal constitutents of the wood. Several of the creosoted poles in the two lines just discussed have been subjected to this extraction process. The composition of the extract obtained has been studied in all cases, and in some of the cases determinations have also been made of the amount of extract obtained from unit volumes of the timber. The results of this work are summarized in Table VIII.

It will be seen that extractions of preservative have been made both from the top and the butt sections of poles. The top of the pole is exposed to the action of sun, air, and rain. The action of gravity also tends to produce movement of the preservative toward the butt of the pole. The butt end of the pole, being surrounded by the soil, is much less subject to loss by evaporation, since the direct access of air to it is slight and heating through direct exposure to the sun is eliminated. Some evaporation can probably occur through porous soil and some through the vessels of the pole timber. The removal of any soluble constituents of the preservative is, of course, facilitiated by the exposure of the butt to ground water.

Examination of the table of analyses will show that

the conditions to which the top of the pole is exposed cause a more rapid removal of the volatile constituents of the preservative than occurs in the butt section. Analytical data showing the composition of the oil with which a particular pole was impregnated are not available, but the average results of all tests made on oil used for treating the poles in the Washington-Norfolk and the Montgomery-New Orleans lines are given in Appendix "A." It will be seen by comparing the average results with the individual data of Table 8 that the poles have suffered losses in the proportion of low boiling constituents.

DATA ON THE CREOSOTED YELLOW PINE POLES IN THE MONTGOMERY-NEW ORLEANS LINE Poles Installed 1899

TABLE VIII.—RESULTS FROM RECOVERY OF PRESERVATIVE FROM POLES IN SERVICE.

	Washington-Norfolk line												Montgomery-New Orleans Line					
	Results from poles removed in 1906												Results from pole removed in 1908			Results from pole removed in 1905		
	Pole 10749		Pole 2931		Pole 9709		Pole 1425		Pole 29				Pole 5348			(No. 10272 — from Bay St. Louis)		
													Butt			Butt		
	Top	Butt	Top	Butt	Top	Butt	Top	Butt	Top	Butt	Top		Above Grd. Line	Below Grd. Line	Top	Above Grd. Line	Below Grd. Line
Weight of extract in lb. per cu. ft.																		
Outside ring	..	..	..	..	..	..	..	..	..	..	4.4		3.5	6.7	1.5	2.3	4.8	
Total section	..	..	..	..	..	..	..	..	..	..	2.3		1.0	2.9	0.9	1.6	3.1	
Analysis of extract																		
Specific gravity	1.066	1.035	1.058	1.048	..	1.054	..	..	..	..	1.092		1.065	1.044	..	..	1.03	
Tar acids (%)	..	..	..	..	..	..	..	..	..	..	5.5		4.2	3.6	Trace	Trace	2.	
Distillate (%)																		
Below 210 deg. cent.	1.8	2.3	1.7	2.3	3.1	2.4	7.9	1.9	3.2	0.5	1.9		1.2	2.1	0.6	0.3	4.0	
Between 210 deg. cent. and 235 deg. cent.	6.5	42.5	22.4	35.8	6.7	15.6	32.0	39.6	21.4	44.3	4.0		4.4	14.4	0.7	0.7	9.4	
Between 235 deg. cent. and 270 deg. cent.	23.9	22.5	14.1	16.4	18.3	24.8	19.4	23.7	24.2	25.7	6.6		21.5	29.9	2.9	3.1	21.6	
Above 270 deg. cent. + residue	67.8	32.7	61.8	45.5	71.9	57.2	40.7	34.8	51.2	29.5	87.5		72.9	54.6	95.8	95.9	65.0	

The data indicate that no appreciable loss by evaporation occurs in the case of constituents of the oil distilling above 270 deg. cent. Such cases as pole No. 10,272 of the Montgomery-New Orleans line which show the least amount of preservative in the top section of the pole, with increasing amounts as sections are examined nearer to the butt end of the pole, illustrate the effect of gravity in removing preservatives from the upper parts of the pole. This pole No. 10,272, it may be noted, was exposed in a warmer climate than the other poles reported upon and the minute percentages of low boiling constituents remaining in the sections above the ground line undoubtedly are a consequence of the temperatures to which it was exposed. The retarding effects exercised by envelopment with soil upon the evaporation of preservative are well illustrated in the case of the section of this pole taken from below the ground line which contained substantial amounts of oil boiling below 270 deg. cent.

It will be noticed that the section of pole No. 5348 of the Washington-Norfolk line taken from just above the ground line shows a smaller quantity of preservative extracted than was obtained from the top section. This pole was removed on account of decay which had entered at one side in the ground line section and had destroyed practically all of the untreated central portions of the pole when it was removed from service. The decayed section had a sound treated shell near the point where decay entered which was much thinner than the shell on the opposite side of the pole. It seems probable that this ground line section was deficient in impregnation, and that the irregularities noticed in the analytical results are a consequence of this deficiency.

As indicated in Table VIII, the first poles subjected to extraction were removed from the line in 1906. These pole samples were divided among several laboratories. Dr. Von Schrenk published the results of his work upon these samples in the following year. The results obtained with these poles, together with other work of a similar nature brought out at the same time, have since exercised a strong influence upon developments relating to the choice of preservatives.

BUTT TREATMENTS.

The investigations relating to butt treated poles which we shall describe, have been carried on in cooperation with the United States Forest Service. Numerous publications relating to this work illustrate the great care and attention which the Forest Service has given to these projects. The development of the open tank treatment for poles is probably the most prominent contribution from the Forest Service, but the preparation of all poles for the experiments was also carried on by its representatives and the attention which was given to details in this work has been found to be of the greatest value.

The Brush Treatment.—The first use of the brush treatment in telephone construction and, so far as our information goes, the first application to poles, was made by the Colorado Telephone Company. In June, 1899, a 30-ft. Michigan cedar pole line was built between Denver and Boulder. Four hundred and twenty of the poles used in this line were treated with carbolineum; the oil being heated to temperatures of from 120 deg. to 150 deg. fahr., and applied to the butts of the poles with a wide brush. With the treatel poles, an approximately equal number of untreated poles was installed, each of these two classes being set alternately in groups of five.

The country through which this line passes is rough; the soil is composed of "gumbo," black clay, rock and sand; part of the line is located in swampy ground. In August 1903 an inspection was made of representative sections of the line. It was found that the poles which had been treated were sound, while the poles which had not been treated were found to have decayed to a depth of from ½ of an inch to 1½ inches. Subsequent inspections made of this line have confirmed the conclusion, drawn after the first inspection, to the effect that the brush treatment was successful in preserving the poles. Experience with other lines, built shortly after, upon which the brush treatment was used, developed the very important conclusion that success with the brush treatment could only be expected when it was applied to seasoned poles.

In applying a brush treatment, that part of the surface of the pole which it is desired to protect by the preservative should first be thoroughly cleaned. All dirt, adhering inner bark, soft or decayed timber, etc., should be cleared away. The pole should be seasoned before it is attempted to apply the treatment and the surface which it is desired to treat should be dry. The

preservative is applied to the cleaned surface by means of a brush, preferably one with a long handle. The application is most conveniently carried out when the pole is placed so that it can be rotated while the preservative is applied to the upper segments of its surface. The pole is then turned until the entire surface has been coated. As the aim of the process is to impregnate the timber, the surface which is being brushed should be kept flooded with the preservative and care should be taken to cause the preservative to enter all cracks, checks, knot holes, etc. The best results will be obtained by applying a second coat of preservative after the first coat has had time to work its way into the wood. Although some preservatives will give fair penetration when applied cold, the best results with any preservative are undoubtedly obtained when it is heated before application, preferably to from 150 deg. to 200 deg. fahr.

The extent of the surface to which the treatment is applied can best be determined after consideration of the characteristics of the soils in which the treated pole may be placed. It does not seem to be necessary to carry the treatment from a point above the ground line all the way to the lower end of a pole except in cases where heavy decay takes place near the butts of untreated poles as well as in the ground line section. For the usual case of heavy decay concentrated at the ground line section, a treatment extending from one foot above the ground line to two feet below it should be sufficient. Most of the poles to be reported upon were treated from a point two feet above the butt of the pole to a point eight feet above the butt. The cedar poles locally treated in Nebraska and placed in the Omaha-Denver line were, however, only treated in the ground line section, *i e.,* from about one foot above the ground line to about two feet below it.

The Open Tank Treatment.—When plans are being made for the experiments with poles whose results we are about to describe, much thought was given to methods which could be used as an alternative to brush treatments. Several methods were given a preliminary trial, but the only one which was found to be practicable was that to which the name of the *open tank treatment* has been given. Various timber parts had previously been treated by immersion in hot or cold preservative, but the first application of this type of process for treating the butts of poles appears to have occurred in the case of these experiments.

The process consisted in immersing the butt ends of the poles to be treated in the hot preservative and keeping them immersed until the bubbling, caused by air or water escaping from the pole, ceased. The hot oil was then allowed to cool and the vacuum created in the cells of the pole timber in the course of the heating assisted in drawing oil into the wood. In the earlier work with this process, 24 hours was occupied in dealing with a charge of poles, the heat being kept up during the greater part of the working day. The oil was allowed to cool over night and the poles withdrawn from the bath the next morning. In the later work, particularly in the case of chestnut poles treated at Parkton, Md., the possibility of shortening the period of heating was studied and a considerable reduction in the total time required for treatment attained.

The open tank treatment causes a substantially greater penetration of the preservative into the wood than does the brush treatment. Measurements of penetration upon "open tank" poles show a range in depth of penetration from ¼ of an inch to ½ of an inch or more, while penetration with the brush treatment may range from a little over $\frac{1}{16}$ of an inch to somewhat under ¼ of an inch. The open tank treatment uses much larger quantities of preservative per pole than the brush treatment, as will be seen from the data assembled in the tables relating to poles handled under these two processes. This increase in the quantity of preservative absorbed is due to the greater depth of penetration and to the greater length of pole butt treated.

Distribution and Location of Exprimental Series.—Three independent series of poles have been installed in order to secure an experimental determination of the effect of butt treatments. The first series was located in the Savannah-Meldrim line of the Southern Bell Telephone and Telegraph Company. The installation of the poles was completed in the summer of 1905. The experimental poles are located just west of Savannah in the relatively low land which reaches back from the seacoast border of the State of Georgia. This location was known to be one in which untreated poles decayed at a relatively rapid rate. It was selected with a view to obtaining a severe test of the experimental treatments and with the hope that conclusive results as to their efficiency could be obtained in a relatively short time.

The second series of poles was installed in the late summer and fall of 1905 in the Buffalo-Warren line of the American Telephone and Telegraph Company. The experimental poles were placed in a section of this line lying between Gowanda, N. Y., and Warren, Pa. About two-thirds of the poles are north and one-third south of Jamestown, N. Y. The experimental poles are located in a rolling country. The settings are well distributed between hill and valley surroundings. The hills grow higher and more precipitous as the southern end of the section is approached. This location was chosen so as to give evidence as to the behavior of treated poles in the northern part of this country. It was not expected that deterioration would be as rapid as in the Savannah-Meldrim line and experience has justified this expectation.

The third experimental series was placed in the Omaha-Denver line of the American Telephone and Telegraph Company. Most of the experimental poles were located between Ashland and Lincoln, Neb., but one group of about 300 poles was placed considerably west of this section near North Platte, Neb. The country in which this series is located is relatively level with moderate undulations, gradually rising in altitude toward the West. The line was built in 1910. Of the three lots of experimental poles placed, one had been prepared late in 1906 and another early in 1907. As these poles had to be held for three years before a location could be secured, it was thought that changes might have occurred during the period of storage which would tend to increase their rate of deterioration. Several hundred cedar poles were, therefore, brush treated under carefully observed conditions at the time the line was built and set in groups with untreated cedar poles so as to afford a check upon the behavior of the treated poles which had been kept in storage.

Preservatives Used.—The preservatives used in all brush and open tank treatments reported upon are distillates of either coal tar or wood tar. Six of the preservatives used are proprietory compounds sold commercially under trade names. These six preservatives have been given letter designations and will be referred to by these letters throughout this paper.

The only other preservative used was dead oil of

TABLE X—DATA ON THE EXPERIMENTAL POLES IN THE SAVANNAH-MELDRIM LINE.

	Preservative applied or preparation, if untreated	Decrease in ground line circumference (inches) between the inspections for poles unsound at preceding inspection. 1909-1910 No. of poles	Ave.	1910-1912 No. of poles	Ave.	1912-1913 No. of poles	Ave.	Maximum and minimum decrease in ground line circumference (inches) found at the inspection in the year. (*Shows number of poles.) 1909 Max.	Min.	1910 Max.	Min.	1912 Max.	Min.	1913 Max.	Min.
Juniper poles obtained at Wilmington, N. C.	Preservative "A"	7	3.2	12	2.6	12	5.1	½*	⅛***	10*	¼*	16¾*	⅛*	14*	¾*
	Preservative "B"	7	5.2	7	3.2	4	9.1	½**	⅛*	13¼*	1**	13½*	1½**	17½*	1*
	Preservative "B"	2	3.4	2	2.8	1	3.0	1½*	¼*	7*	1½*	12*	2*	5*	5*
	Preservative "C"	8	3.3	12	3.8	13	4.8	1½*	⅛**	12½*	⅛***	14½*	¼*	15***	2*
	Preservative "E"	10	5.3	8	2.0	10	5.6	2¼*	⅛****	24*	¼*	9¾*	⅛*	14*	¼*
	Preservative "F"	18	3.4	20	0.88	17	5.7	3½*	⅛**	25*	¼*	5½*	¼*	14¾**	2*
	Dead Oil of Coal Tar	8	2.4	20	2.9	21	5.5	2*	⅛****	10½*	⅛***	10**	⅛*	15*	¼*
	Dead Oil of Coal Tar	4	1.5	8	1.8	6	6.4	2½*	⅛*	7*	⅛***	9*	¼*	14¼*	¾*
	Tar Brushed—Green	12	2.9	9	1.7	6	4.7	4½*	¼*	17½*	1¼*	9⅛*	1½*	12¼*	2⅛*
	Tar Brushed—Seasoned	24	2.2	19	2.8	13	5.5	6¼*	⅛*	14*	1⅜*	14½*	1½*	18½*	2⅛*
	Untreated—Green	95	3.4	67	2.8	41	3.4	6¼*	⅛**	16¾*	½*	17¼*	2*	21*	2¼*
	Untreated—Seasoned	103	5.5	63	3.8	32	5.7	15*	¼*	22*	2¼*	17½*	2¾**	17½*	4⅜*
Chestnut poles obtained at Pisgah, N. C.	Preservative "A"	2	0.56	4	0.13	7	4.5	⅜*	⅛*	1½*	⅛**	1¾*	⅛***	15¾*	¼*
	Preservative "A"	2	0.25	2	0.31	2	0.44	¼*	⅛*	⅜*	¼*	1⅛*	⅜*	1½*	¾*
	Preservative "B"	4	3.3	5	0.48	8	3.1	6*	⅛**	18¼*	⅛*	1½*	⅛*	16½*	⅜*
	Preservative "B"	0	...	0	...	1	1.4	.....	..	..	..	⅛*	⅛*	1½*	1½*
	Preservative "C"	6	1.9	12	1.4	16	3.3	⅜**	¼****	6¾*	¾***	15½*	¼**	20*	¼*
	Preservative "E"	8	1.5	15	3.2	13	3.8	1½**	⅛****	8½*	¼**	25*	¼*	17½**	½*
	Preservative "F"	6	3.3	8	2.6	9	2.2	1½*	⅛***	17*	⅜*	19¾*	⅛**	15**	¼**
	Dead Oil of Coal Tar	1	1.1	2	0.5	2	1.8	⅜*	⅜*	1½*	½*	2*	1*	3½*	3*
	Dead Oil of Coal Tar	11	0.54	17	1.4	18	3.5	2½*	⅛***	4½*	⅛*******	17¾*	¼*****	20¾*	¼*****
	Dead Oil of Coal Tar	2	1.1	2	6.7	1	0.9	3¾*	¼*	6*	¼*	19¼*	⅜*	15*	½*
	Tar Brushed—Green	12	1.9	11	0.39	11	0.9	2¾*	¼**	15*	½*	3¾*	1¼*	4½*	2⅜*
	Tar Brushed—Seasoned	23	1.3	24	2.4	21	4.5	2¾*	⅛*	11½*	⅛*	18½*	1⅛*	21*	1⅝*
	Untreated—Green	96	1.2	91	1.2	83	2.1	17½*	⅛*	19¾*	¼*	16½*	¾**	19½*	⅛*
	Untreated—Seasoned	110	2.9	100	2.6	87	3.8	14*	¼*	23**	½**	23½*	¾*	21¼*	1½*

Decrease in ground line circumference (inches)

	Preservative applied or preparation, if untreated	Including poles designated for reconstruction at inspection: Average including sound poles 1909	1910	1912	1913	Average omitting sound poles 1909	1910	1912	1913	Omitting poles designated for reconstruction at inspection: Average including sound poles 1909	1910	1912	1913	Average omitting sound poles 1909	1910	1912	1913
Juniper poles obtained at Wilmington, N. C.	Preservative "A"	0.07	1.1	2.4	4.9	0.23	2.2	4.1	7.8	0.07	1.1	1.4	2.9	0.23	2.2	2.5	5.5
	Preservative "B"	0.10	2.0	2.1	4.5	0.30	4.6	5.7	8.5	0.10	0.92	0.84	1.8	0.30	2.5	2.8	4.9
	Preservative "B"	0.58	2.8	4.7	2.5	0.88	4.3	7.0	5.0	0.58	2.8	1.0	2.5	0.88	4.2	2.0	5.0
	Preservative "C"	0.15	1.5	3.2	8.0	0.44	3.0	4.6	8.0	0.15	1.0	1.8	7.1	0.44	2.1	2.7	7.1
	Preservative "E"	0.25	2.4	2.2	7.0	0.60	5.9	3.5	8.4	0.25	1.1	1.8	4.2	0.60	2.9	3.0	5.5
	Preservative "F"	0.77	3.5	2.2	7.6	1.0	3.7	2.3	8.0	0.77	1.4	2.2	5.2	1.0	1.4	2.3	5.6
	Dead Oil of Coal Tar.	0.18	1.1	2.5	6.4	0.78	1.7	3.3	8.1	0.18	0.84	2.2	5.3	0.78	1.3	3.0	6.9
	Dead Oil of Coal Tar.	0.22	0.77	2.2	6.6	0.78	1.3	7.8	1.5	0.22	0.77	1.7	5.0	0.78	1.4	2.2	5.9
	Tar Brushed—Green	2.2	5.1	5.0	8.3	2.2	5.1	5.0	8.3	2.2	3.6	3.6	3.4	2.2	3.6	3.6	3.4
	Tar Brushed—Seasoned	3.2	6.5	7.6	11.0	3.2	6.5	7.6	11.0	3.2	4.8	5.8	6.0	3.2	4.8	5.8	6.0
	Untreated—Green	2.8	6.2	6.8	8.5	2.8	6.2	6.8	8.5	2.8	4.1	4.9	5.6	2.8	4.1	4.9	5.6
	Untreated—Seasoned	3.3	8.6	9.5	11.6	3.3	8.6	9.5	11.6	3.1	5.6	6.6	8.6	3.1	5.6	6.6	8.8
Chestnut poles obtained at Pisgah, N. C.	Preservative "A"	0.03	0.11	0.17	1.9	0.25	0.50	0.43	4.9	0.03	0.11	0.17	1.1	0.25	0.50	0.43	3.1
	Preservative "A"	0.09	0.22	0.38	0.78	0.19	0.44	0.75	1.0	0.09	0.22	0.38	0.78	0.19	0.44	0.75	1.0
	Preservative "B"	0.39	1.2	0.32	1.9	1.8	3.4	0.69	3.8	0.39	0.14	0.32	0.92	1.8	0.48	0.69	2.0
	Preservative "B"	0.00	0.00	0.06	0.75	0.00	0.00	0.13	1.5	0.00	0.00	0.06	0.75	0.00	0.00	0.13	1.5
	Preservative "C"	0.08	0.76	2.3	4.6	0.29	1.5	3.1	5.9	0.08	0.76	1.7	3.2	0.29	1.5	2.3	4.3
	Preservative "E"	0.19	0.83	2.9	3.5	0.58	1.2	4.4	5.3	0.19	0.83	1.1	1.2	0.58	1.2	1.8	2.0
	Preservative "F"	0.14	1.1	1.3	2.1	0.56	3.0	3.4	4.6	0.14	0.42	0.49	1.5	0.56	1.2	1.2	3.4
	Dead Oil of Coal Tar.	0.19	1.0	1.5	3.3	0.38	1.0	1.5	3.3	0.19	1.0	1.5	3.3	0.38	1.0	1.5	3.3
	Dead Oil of Coal Tar.	0.25	0.43	1.1	2.4	0.92	1.0	2.0	4.6	0.25	0.43	0.63	0.98	0.92	1.0	1.2	2.0
	Dead Oil of Coal Tar.	0.67	1.0	3.3	3.3	2.0	3.1	9.8	5.5	0.67	1.0	0.08	3.3	2.0	3.1	0.38	5.5
	Tar Brushed—Green	1.3	3.2	2.5	3.4	1.3	3.2	2.5	3.4	1.3	2.1	2.5	3.4	1.3	2.1	2.5	3.4
	Tar Brushed—Seasoned	1.0	2.2	4.6	7.4	1.1	2.2	4.6	7.3	1.0	2.2	2.9	4.8	1.1	2.2	2.9	4.8
	Untreated—Green	1.6	2.8	3.3	4.5	1.6	2.8	3.3	4.5	1.6	2.1	2.4	3.4	1.6	2.1	2.4	3.4
	Untreated—Seasoned	1.7	4.6	5.7	7.8	1.	4.6	5.7	7.8	1.6	3.3	3.9	5.5	1.6	3.3	3.9	5.5

	Preservative applied or preparation, if untreated	No. of coats of preservative applied	No. of poles under observation	Amount of oil applied per pole (lbs.) Ave.	Max.	Min.	Period of seasoning (mos.) Max.	Min.	Ave.	Poles sound at inspection in the year 1909 No. of poles	Per cent. No. under observation	1910 No. of poles	Per cent. No. under observation	1912 No. of poles	Per cent. No. under observation	1913 No. of poles	Per cent. No. under observation
Juniper poles obtained at Wilmington, N. C.	Preservative "A"	2	24	3.6	4¾	2⅝	20	9	14.5	17	71.	12	50.	10	42.	8	33.
	Preservative "B"	2	21	3.7	5¼	2¾	20	10	15.2	14	67.	12	57.	12	57.	7	33.
	Preservative "B"	1	3	1.6	1⅝	1⅝	10	9	9.3	1	33.	1	33.	1	33.	1	33.
	Preservative "C"	3	24	4.7	5½	4⅛	20	9	14.5	16	67.	11	46.	7	29.	0	0.
	Preservative "E"	2	24	4.4	5¼	3⅜	20	9	14.5	14	58.	14	58.	8	33.	3	13.
	Preservative "F"	2	24	6.0	7⅜	4½	20	9	14.5	6	25.	1	4.	1	4.	1	4.
	Dead Oil of Coal Tar.	2	34	4.9	6⅜	3¼	19	9	13.1	26	76.	12	35.	8	24.	6	18.
	Dead Oil of Coal Tar.	3	14	7.0	8½	5⅝	20	15	17.9	10	71.	6	43.	3	21.	1	7.
	Tar Brushed—Green	1	12	...	...	...	..	..	.....	0	0.	0	0.	0	0.	0	0.
	Tar Brushed—Seasoned	1	24	...	...	...	20	9	14.5	0	0.	0	0.	0	0.	0	0.
	Untreated—Green	..	96	...	...	...	..	..	.....	1	1.	0	0.	0	0.	0	0.
	Untreated—Seasoned	..	104	...	...	...	20	9	14.5	0	0.	0	0.	0	0.	0	0.
Chestnut poles obtained at Pisgah, N. C.	Preservative "A"	2	18	4.1	5⅛	2⅞	22	12	17.2	16	89.	14	78.	11	61.	11	61.
	Preservative "A"	1	4	3.7	4⅝	2⅜	23	14	18.5	2	50.	2	50.	2	50.	1	25.
	Preservative "B"	2	18	4.2	5½	3⅛	23	14	18.7	14	78.	12	67.	9	50.	8	44.
	Preservative "B"	1	2	3.2	3⅞	2½	13	12	12.5	2	100.	2	100.	1	50.	1	50.
	Preservative "C"	3	23	6.7	9⅛	4⅞	23	12	17.5	17	74.	11	48.	6	26.	5	22.
	Preservative "E"	2	24	5.4	7	3¾	23	12	17.5	16	67.	8	33.	8	33.	7	29.
	Preservative "F"	2	24	6.4	8⅜	4½	23	12	17.5	18	75.	15	63.	13	54.	12	50.
	Dead Oil of Coal Tar.	1	2	5.1	5½	4⅝	23	23	23.	1	50.	0	0.	0	0.	0	0.
	Dead Oil of Coal Tar.	2	40	6.9	10⅝	3⅛	23	12	17.7	29	73.	23	58.	18	45.	17	43.
	Dead Oil of Coal Tar.	3	6	6.5	8¼	3¾	18	12	14.3	4	67.	4	67.	4	67.	2	33.
	Tar Brushed—Green	1	12	...	...	...	..	..	.....	0	0.	0	0.	0	0.	0	0.
	Tar Brushed—Seasoned	1	24	...	...	...	23	12	17.5	1	4.	0	0.	0	0.	0	0.
	Untreated—Green	..	96	...	...	...	..	..	.....	0	0.	0	0.	0	0.	0	0.
	Untreated—Seasoned	..	111	...	...	...	23	12	17.4	0	0.	0	0.	0	0.	0	0.

coal tar. As will be seen from the analyses of this material which we give, the dead oil used in the experimental work was a good representative of the product ordinarily obtainable for creosoting treatments in the market at the time the experiments were started. Since then a tendency has arisen for giving preference to dead oils containing less low-boiling constituents. In consequence of this change in opinion the dead oil which was used would today be regarded as a little below the standard grade.

The six proprietary preservatives and the dead oil of coal tar were each used independently for brush treating experimental poles. Only dead oil of coal tar was used in preparing the open tank treated poles. The much greater quantity of preservative needed for the open tank treatment makes the employment of a low priced preservative desirable and the dead oil of coal tar was distinctly lower in price than any of the other preservatives experimented with.

Experience with Coal Tar.—In addition to the experiments outlined above, treatments with undistilled coal tar and undistilled pine tar were also applied to a number of poles included in the Savannah-Meldrim and the Buffalo-Warren series. The tar was heated and applied to the pole by a brush just prior to setting. No appreciable penetration into the wood was obtained. The tar formed a substantial superficial coating which, in most cases, still appeared to be in good condition when the first inspections of the experimental poles were made four to five years after their setting. It was found, however, that this superficial coating was ineffective in preventing decay so that the tar coated poles had deteriorated practically to the same extent as adjacent untreated poles. This experience indicates clearly the ineffectiveness of a tar coating from a preservative standpoint, and no further reference to the tar coated poles reported upon in the tables of results will be made in the discussions to follow.

Savannah-Meldrim Line.—The experimental series placed in the Savannah-Meldrim line included approximately equal numbers of juniper (chamaecyparis thyoides) and of chestnut (castanea dentata) poles. The juniper poles were collected at Wilmington, N. C., for seasoning and treatment. The chestnut poles were collected at Mt. Pisgah, N. C., for similar work.

Brush treatment was the only method of preservation employed in preparing the treated poles in this line. All of the brush treated poles had been seasoned prior to their treatment. Half of the poles included in the experimental series were untreated and were set for the purpose of giving direct comparisons with the treated poles. A little more than half of the untreated poles were seasoned; the remainder were green when set.

Treated and untreated poles of the same species were placed alternately in the line. The exact order of setting is shown in detail in Table IX. The poles were classified so that the seasoned poles contained in each sub-series of 34, such as is shown in Table IX, had been subjected to seasoning for the same length of time. There were 12 sub-series of juniper poles and 12 sub-series of chestnut poles.

Several of the poles prepared for the experiment were injured in the course of transportation or setting. Several other poles to which it was intended to apply treatment failed to receive it on account of the supply of some of the preservatives running short. In consequence of this, it will be seen on examining Table X, which gives the experimental data secured from the Savannah-Meldrim line, that there were slight deviations from the arrangement indicated by Table IX.

Four inspections have been made to determine the condition of the experimental poles in the Savannah-Meldrim line. The first inspection was made in May 1909, about four years after the poles had been placed. The second inspection was made in November 1910; the third inspection in February 1912; and the fourth inspection in November 1913. In inspecting poles the earth was dug away to expose the ground line section for a depth of nearly two feet. The condition of the section

TABLE IX.

No. of pole	Condition when set	Preservative applied	Method of treatment
1	Seasoned	Preservative "A"	Brush
2	Seasoned		Untreated
3	Seasoned	Preservative "A"	Brush
4	Green		Untreated
5	Seasoned	Preservative "B"	Brush
6	Seasoned		Untreated
7	Seasoned	Preservative "B"	Brush
8	Green		Untreated
9	Seasoned	Preservative "C"	Brush
10	Seasoned		Untreated
11	Seasoned	Preservative "C"	Brush
12	Green		Untreated
13	Seasoned	Dead Oil of Coal Tar	Brush
14	Seasoned		Untreated
15	Seasoned	Dead Oil of Coal Tar	Brush
16	Green		Untreated
17	Seasoned	Dead Oil of Coal Tar	Brush
18	Seasoned		Untreated
19	Seasoned	Dead Oil of Coal Tar	Brush
20	Green		Untreated
21	Seasoned	Preservative "E"	Brush
22	Seasoned		Untreated
23	Seasoned	Preservative "E"	Brush
24	Green		Untreated
25	Seasoned	Preservative "F"	Brush
26	Seasoned		Untreated
27	Seasoned	Preservative "F"	Brush
28	Green		Untreated
29	Seasoned	Coal-tar	Brush
30	Seasoned		Untreated
31	Seasoned	Coal-tar	Brush
32	Green		Untreated
33	Green	Coal-tar	Brush
34	Seasoned		Untreated

Note: The above series was repeated 24 times, series No. 2 beginning with pole No. 35, series No. 3 with pole No. 69, etc.

was then carefully determined. Poles which showed no signs of deterioration or decay were classified as "sound." As was to be expected, the application of this designation was practically restricted to treated poles. Poles showing signs of deterioration or decay were carefully examined to determine the extent of the change. All soft and decayed matter which would interfere with the determination of the ground line circumference of sound wood was removed and the circumference then measured. All "pockets" of decay, whether external or internal in location, were carefully explored and measured, so that a proper reduction factor could be applied to the measured ground line circumference in order to obtain the ground line circumference equivalent to the amount of sound wood remaining in the pole.

During the course of each inspection special attention was given to the condition of any poles showing substantial deterioration with a view to determining whether they had fallen below the standard established for the maintenance of the line. Careful record was kept of all poles which were found to have fallen below the standard of maintenance, and of the methods selected by the Southern Bell Telephone and Telegraph Company for the reconstruction of these poles, whether by resetting, reinforcement or replacement. Record was also kept of any of the experimental poles undergoing reconstruction between inspections and of the cause for the line change. Where reconstruction has occurred due to other causes than deterioration by decay allowance for the fact has been made in the summarizing of the data.

Table X sets forth in summarized form the data relating to individual poles accumulated in these inspections. The table includes data relating to the seasoning and the treatment of the poles and the results of each

inspection with respect to soundness, changes in circumference of good wood, and reconstruction work. It will be seen that by the time of the first inspection four years after the date of setting, decay had set in in the case of practically all untreated poles but that only a moderate proportion of the treated poles had at that time been affected by decay. The percentage of treated poles remaining sound decreased with each subsequent inspection, so that at the time of the last inspection in 1913

TABLE X—CONTINUED.

	Preservative applied or preparation, if untreated	Reconstruction: No. of poles that had reached replacement dimension at the inspection in the year							
		1909		1910		1912		1913	
		No. of poles	Per cent. No. under observation	No. of poles	Per cent. No. under observation	No. of poles	Per cent. No. under observation	No. of poles	Per cent. No. under observation
Juniper poles obtained at Wilmington, N. C.	Preservative "A"	0	0.	0	0.	2	8.	7	29.
	Preservative "B"	0	0.	2	10.	4	19.	7	33.
	Preservative "B"	0	0.	0	0.	1	33.	1	33.
	Preservative "C"	0	0.	1	4.	4	17.	8	33.
	Preservative "E"	0	0.	2	8.	3	13.	11	46.
	Preservative "F"	0	0.	3	13.	3	13.	9	38.
	Dead Oil of Coal Tar	0	0.	1	3.	3	9.	7	21.
	Dead Oil of Coal Tar	0	0.	0	0.	1	7.	3	21.
	Tar Brushed—Green.	0	0.	2	17.	6	50.	10	83.
	Tar Brushed — Seasoned	0	0.	5	21.	10	42.	18	75.
	Untreated—Green	0	0.	28	29.	51	53.	75	78.
	Untreated—Seasoned.	1	1.	39	38.	67	64.	89	86.
Chestnut poles obtained at Pisgah, N. C.	Preservative "A"	0	0.	0	0.	0	0.	1	6.
	Preservative "A"	0	0.	0	0.	0	0.	0	0.
	Preservative "B"	0	0.	1	6.	1	6.	2	11.
	Preservative "B"	0	0.	0	0.	0	0.	0	0.
	Preservative "C"	0	0.	0	0.	1	4.	3	13.
	Preservative "E"	0	0.	0	0.	2	8.	5	21.
	Preservative "F"	0	0.	1	4.	2	8.	3	13.
	Dead Oil of Coal Tar	0	0.	0	0.	0	0.	0	0.
	Dead Oil of Coal Tar	0	0.	0	0.	1	3.	4	10.
	Dead Oil of Coal Tar	0	0.	0	0.	1	17.	1	17.
	Tar Brushed—Green.	0	0.	1	8.	1	8.	1	8.
	Tar Brushed — Seasoned	0	0.	0	0.	3	13.	7	29.
	Untreated—Green	0	0.	5	5.	13	14.	22	23.
	Untreated—Seasoned.	1	1.	11	10.	23	21.	40	36.

about 20 per cent of the juniper poles and about 40 per cent of the chestnut poles were still free from decay.

The changes in the circumference of sound wood are set forth in considerable detail. Where a large part of the poles which were subjected to any particular method of preservation are still sound, the average decrease in circumference for the group will necessarily be comparatively small because the divisor includes a large number of units which have not contributed to the decrease. Average changes in circumference for poles which showed decay are, therefore, given. Under the severe conditions of exposure which characterize this line, the decay of a pole which is at or near the end of its serviceable life, is liable to proceed rapidly. Because of this, it has been found desirable to give also the average decrease in circumference computed with the poles designated for reconstruction eliminated from the divisor. The table also gives the average decrease in circumference between inspections for poles showing decay at earlier inspections, and the maximum and minimum decrease in circumference recorded at each inspection, for the poles subjected to each particular treatment.

The last group of data included in the table shows the number of units subjected to reconstruction on account of deterioration by decay up to the end of each inspection. The figures given here include not only the poles designated for reconstruction on account of the results of the inspection, but also any poles which may have been reconstructed either directly on account of decay between inspections or which were decayed to such an extent at the previous inspection that their rereturn and at a rate of pay equal to that they were construction for that cause after the following inspection was certain although the nominal cause of removal may not have been given as decay. It will be noticed that over 80 per cent of the untreated juniper poles had been reconstructed by 1913, as against about 30 per cent of the treated poles. About 30 per cent of the untreated, and a little over 10 per cent of the treated, chestnut poles have undergone reconstruction.

(To be concluded).

Chicago Company Opens Recreation Camp

The recreation camp for the tired, nervous, overworked and sick operators of the Chicago Telephone Company, to be located at Warrenville, Ill., east of Aurora, on the third rail division of the A., E. & C. railroad is now practically completed.

William McFryer, manager of the Wheaton district of the Chicago Telephone Company, stated that all the land required had been purchased.

The company has purchased 36 acres on the Du-Page river, 700 feet from the Warrenville third rail station on the Batavia road. It is expected to have the camp buildings ready for occupancy by the middle of June.

The main building will be of the New England residence type, two stories in height, with white exterior and green blinds. There will be a large rest room with fireplace, while a wing extending from the main building will be devoted to sleeping rooms and at the end of the wing there will be large sleeping porches. The plans call for a bathroom for each two bedrooms.

The heating plant, dining room and kitchen will be located in a different building, 75 feet away from the main building, and reached through a pergola, which will be inclosed with glass in winter; thus the danger of fire will be eliminated and there will be no odors of cooking in the main building. All modern improvements will be provided for.

Ample opportunity will be afforded to enjoy out-of-door sports, such as baseball, tennis, croquet, bathing and boating. The river is not deep, thus insuring safety to girls in the enjoyment of water sports.

Extra Vacation Offered Bell Employes

H. J. Pettengill, president of the Southwestern Telegraph and Telephone (Bell) Company, has announced that employes of his company who join the National Guard of Missouri will be permitted, in addition to their regular vacations, to attend the state militia encampment on regular pay, and if they are called to war their positions will be held open for them.

The announcement was made at a meeting of the National Guard Committee of the Business Men's League, of which Mr. Pettengill is a member. The formal announcement was:

"The Southwestern Telegraph and Telephone Company will give to its regular monthly employes who are members of the National Guard of Missouri, in addition to the regular vacations they receive, an extra vacation of from one week to ten days, in order that these employes may attend the annual encampment.

In case of war the company will see to it that any of its employes who are called to serve their country will be provided with positions upon their receiving when called."

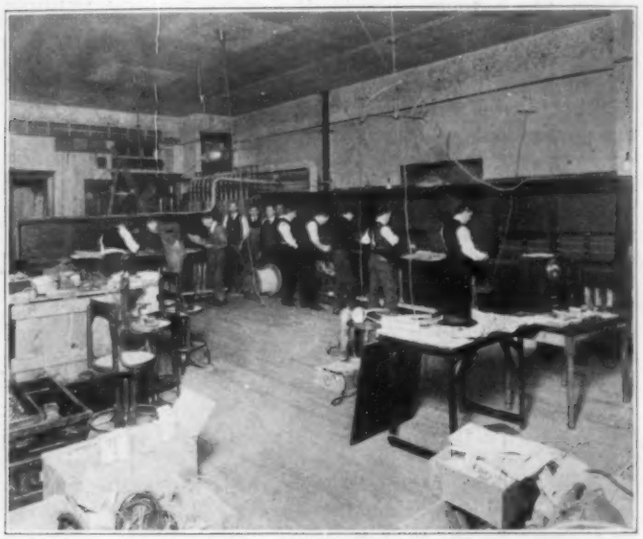
Of Interest to the Trade

What the Telephone and Accessory Manufacturers Are Doing to Advance the Art

A Record Emergency Installation

On Saturday night, January 15, 1916, the plant of the Dixon Home Telephone Company, Dixon, Illinois, was visited by fire and completely destroyed. Before the ruins of its home had cooled, the telephone company was making arrangements for its rehabilitation. On January 17, which was Monday, and the first business day after the conflagration, a representative of the telephone company visited Chicago and asked for bids on a complete, new equipment, installation at once.

On Tuesday afternoon, January 18, a contract was signed with the Western Electric Company for the job. Eleven days later, on January 29, the exchange, complete, was cut over. The equipment incorporated 1,200 central battery local lines, 40 toll lines and 55 rural lines.



Restoring the Dixon Exchange.

The following lines taken from the log of the general foreman of the Western Electric Construction gang tell the story better than it can otherwise be written:

1-19—Looked over several buildings where a new exchange could be most speedily installed. We decided on a place about noon and then proceeded to lay out the floor plans and design trunk circuits for six sections of subscriber board and one switching section, in one line of board and five toll and rural sections in another line, a recording desk, W. C. desk and C. O. desk and complete power equipment. Asked telephone company for two men to be on hand to receive material.

1-20, P. M.—We received seven sections of local board, M. D. F. and part of multiple. Set up M. D. F. and started lining up sections after supper. Telephoned Hawthorne for eight more men who arrived on the job that night.

1-21—The rest of the multiple arrived, also some lengths of stock cable rack. We installed the rack and run in the main to multiple cables. The seven switchboard sections had to be remodeled in order to accommodate 1,500 subscribers multiple, instead of 800 as they were designed. The main to multiple cable was shipped in bulk, and had to be formed, skinned and spliced to the multiple at the first subscriber's section. Intsalled 1,200 subscribers multiple.

1-21, P. M.—We started forming splicing, laying multiple and fanning at V. M. D. F. The 1,300 protectors arrived and were mounted.

On 1-25, P. M. the multiple was all in. We tested it out and cleared trouble. The 1,200 line signals arrived in two shipments, unstrapped. We strapped, mounted and connected them by 1-25, P. M. As fast as we laid the multiple and put the terminals in place, the 1,200 jumpers in rear of sections were run and connected. While this work was being done, men were started mounting master ringing keys and making necessary changes and additions to local cables in sections for four party harmonic ringing. When the subscribers' sections were received, they were short part of the local cables from connecting rack to signals. These we made up locally.

1-22—Five more men arrived on job, making sixteen in all. The terminals for H. M. D. F. arrived 1-21 and we installed them the same day. We worked in conjunction with the outside cable men as they were getting behind in this work due to unforseen conditions. We took over the lacing, fanning and connecting of 1,600 pairs of wool cable on the H. M. D. F. The five toll sections arrived on 1-21, and we set and lined them up the same day. A cable rack from the toll board to a wooden coil rack which was built on the job was installed and we started cabling for 30 toll and rural switching trunks, 15 local to rural, 10 local to recording desk, 5 toll to rural.

On 1-24, A. M. the apparatus for these trunks arrived and by 1-26, P. M. we installed all trunks and tested them out. This also included 55 rural lines and 40 toll lines, and the rewiring of one section of subscribers' board for a switching position also installing call wires between boards and recording desk. Both local and toll boards recording desk including all trunks were ready for operation on 1-27, P. M. and the Wire Chief's desk 1-28, A. M. The Telephone Company started girls testing lines from the local board 1-27, P. M. They delivered the list of cross connections to us on 1-28, A. M. and we ran and connected the list of approximately 1,000 jumpers by 10 A. M. 1-29. The carbons and heat coils being previously installed, service was resumed without further interruption. All apparatus and cabling was installed and numbered in a *permanent manner*. An acceptance of the job was given by the customer on 1-29, with the exception of the one carboy of electrolyte which came late. All material arrived at such a time so as not to delay the work materially. Although there was an unusual amount of rewiring and remodeling to do, and a multiple splice to make, the apparatus was received in good shape and at a time to make a quick installation.

This record, which called forth unsolicited commendation from the telephone officials, will stand as a monument to efficiency as expressed in American telephone practice.

Not Accountable for Paper Famine

The house organ, *Paragraphs*, of the Smith, Dixon Company division of the Whitaker Paper Company recently gave among other causes for the paper famine the explanation that cellulose, the paper base, was also used for high explosives, and that the DuPont Powder Mills had installed a vast plant and was paying fabulous prices for rag stock.

E. I. DuPont de Nemours & Company denies the charge. It explains that it makes guncotton from cotton and smokeless powder from guncotton. The Arlington Company, a DuPont subsidiary, recently bought a paper mill with eight beaters, and has bought a supply of rag stock at higher prices than formerly prevailed. But neither quantity nor prices, it is declared, were such as to create more than a slight and temporary flurry in the rag market.

Complete Catalog of Telephone Supplies

Everything required for the complete equipment and operation of a telephone exchange is shown in the new 224-page general catalog just published by the American Electric Company of Chicago. The latest type wall and desk telephones, and the latest type switchboards, with their integral parts, are well illustrated by clear half-tone cuts. The lines of intercommunicating telephones and their supplies, construction materials, linemen's tools and supplies, are unusually complete, and there are thirty-six pages of diagrams, circuits, tables and formulas that have been prepared for special service to the telephone engineer and manager.

This catalog has been edited by men who know the telephone companies' problems, and who know that if this book is consulted freely it will not only be found instructive, but will be found to contain many valuable

The American Catalog.

suggestions when it comes to filling requirements for this season's rebuilding and extension work.

While much detail of telephone apparatus is shown, the subject matter and descriptions are written so that they will be, as far as possible, nontechnical, and explain all essentials necessary to the proper selection of apparatus and supplies. We do not believe that experienced telephone men will find the information that is given uninteresting, but that this catalog will find a useful place in the files of every practical telephone man.

This book is an unusual specimen of good printing and art work.

The Odd Stock List just issued by the Leeds and Northrup Company, Philadelphia, offers a number of bargains in measuring and testing instruments.

Stromberg-Carlson Equipment for Noblesville, Ind

The Home Telephone Company of Noblesville, Ind., has awarded a contract to the Stromberg-Carlson Telephone Manufacturing Company for a complete exchange equipment to replace the apparatus installed by the same company over fifteen years ago.

The main switchboard will be arranged for an ultimate capacity of 1,800 subscribers' lines, of which 800 are to be equipped for immediate operation. The initial installation will consist of two three-position steel frame sections and a cable turning section with solid mahogany woodwork throughout. The first position will serve as a night toll position and will be equipped with 30 regular toll line equipments and 5 looping toll line equipments. The second position will be a rural line position, equipped for the immediate operation of 50 drop signal line equipments.

The remainder of the switchboard will be equipped with regular central energy subscribers' lines. No answering jacks are specified for these lines, as all calls will be answered directly from the multiple jacks, which are associated with the corresponding multiple lamp jacks in each multiple section.

The night toll position No. 1 will be wired for both toll to toll and universal circuits, but none of the latter will be furnished in the initial installation, and the present equipment will consist of 5 toll to toll cord pair equipments with single lamp supervision. All of the cord circuits in rural line position No. 2 will be of the universal type, which automatically adapt themselves to the requirements of the connection, whether toll to toll or toll to c. c., or c. e. to c. e.

The equipment provides for double lamp supervision for both magnetic and central energy connections, also for the flashing recall signal on the answering cord when a central energy subscriber signals for another connection and when a toll or rural subscriber "rings off." In addition to the flashing recall, a buzzer is provided to give the operator an audible signal when this circuit is operated. The cord circuits in the local positions are to be wired and equipped for automatic ringing, automatic operator's cut-in and cut-off, and recall keys in addition to the flashing recall feature.

The toll switchboard will consist of a standard two-position switchboard of the Stromberg-Carlson Company's standard No. A-5450 type, finished in mahogany to match the main switchboard. Wiring and cabling will be furnished for an ultimate capacity of 20 regular toll line equipments and 10 looping toll line equipments. The wire chief's and chief operator's desks will be of the cordless type, using standard desk type cabinets. The chief operator's desk will contain, in addition to the usual chief operator's equipment, service meters connected with each of the local operators' positions.

Current for the operation of the exchange will be supplied by a storage battery equipment consisting of two sets of eleven of Electric Storage Battery Company's type E-9 cells. The power equipment will include a 20 amp. Mercury Arc Rectifier, harmonic converter with duplicate sets of vibrators, relay interrupter set and a power board with proper control equipment.

The Stromberg-Carlson Company has issued its Bulletin No. 1012, Edition D-A, entitled "Local Battery Switchboards." It is in the usual loose-leaf form, 36 pages and cover, and describes and illustrates the company's very complete line of magneto boards and their parts and circuits.

New Inter-Phone Catalog

The Western Electric Company has issued a new catalog of inter-phones and accessories.

The complete line of inter-phones, the company's trade name for the intercommunicating telephone it manufactures, is shown at length. The various systems available for intercommunication are fully explained, with diagrams showing the service given by each. This is accompanied by complete information as to the amount of wire and cable required, as well as the operating battery requirements.

Several new systems have recently been developed to meet new requirements, and all of these are listed. They include, among others, a new annunciator system arranged for from ten to seventy stations or more, and a new apartment house system to provide for inexpensive and flexible installations.

The new catalog gives all the information needed by the dealer, or contractor who would select, install and operate an inter-phone system designed to meet practically any known requirement for intercommunicating telephone service.

The Telemeter

The Telemeter, as the name indicates, is a subscriber's device for registering telephone calls, thus enabling a check to be kept against increased service bills.

Fig. 1 is a front view of the Telemeter, showing its compactness and freedom from interference while holding the telephone. In making or answering a call the receiver is removed as before. This operation automatically moves the slide rod of the Telemeter to the position shown in Fig. 2. The rod automatically becomes locked in that position, making it impossible to replace the receiver upon the hook unless a button has been pressed, which unlocks the rod and designates whether

The Telemeter Attached to a Desk Telephone.

the call is to be counted or not. On out calls, when the telephone connections have been completed or at any time during or after the conversation, the out call button is pressed before hanging up.

For in and busy calls, etc., during or after the conversation, the no-call button is pressed.

Should the party using the telephone fail or forget to operate the button, he will discover that it is impossible to hang up the receiver until he has done so.

By inserting the reset key in the opening the front (Fig. 1.), marked *L*, the no-call button can be locked and its use prohibited. When this is done it will be found that every time the telephone is used, the call must be counted upon the dials of the Telemeter in order to replace the receiver upon the hook. This arrangement permits the subscriber to obtain knowledge of whether and how often his telephone has been used during his absence. With the aid of the reset key the subscriber may, at any time, move the figures on the dial to zero (000); thus every time he uses his telephone he is made aware of just how many calls he has used to that date.

Fig. 2 shows the impossibility of placing the receiver upon the hook upside down in order to evade moving the rod, and (Fig. 3) there is positively no interference with the movement of the telephone hook, up and down, at any time.

When a button is pressed it remains in that depressed condition until the following call, showing even while the telephone is idle, whether the last call was counted or not. Should either button be pressed more than once or at a time when the telephone is idle, it does not operate the counter or interfere with the interior mechanism. The buttons are within easy reach of the thumb, while holding the telephone in one hand and the receiver in the other.

The Telemeter is patented and marketed by Rupert Greenlaw, 151 West Sixty-fourth street, New York.

A Telephone Catalog That's Different

A new and unusually complete catalog of telephone apparatus and supplies has just been issued and is now being distributed by the Western Electric Company.

This catalog embraces between its covers a section devoted to miniature reproductions of sales helps for those engaged in the resale of Western Electric telephones, inter-phones and other telephone apparatus, and service helps for telephone companies wishing to stimulate a desire for telephone service and so increase the number of their subscribers. These helps include newspaper advertising printing plates, display cards, lantern slides, booklets, etc., and are all furnished free of any charge.

Following this co-operative service section, there will be found listings of everything that is needed by telephone companies for the inside and outside plant—telephones, switchboards, power plants, cables, line construction tools, line construction materials and miscellaneous telephone apparatus. The listings include all types of equipment that are in common use.

Consolidated Publishes Monthly Paper

The Consolidated Telephone Company at Hazelton, Pa., has begun the publication of a monthly paper for its employes named appropriately *The Mouth Piece*. H. H. Weibel, the advertising manager, is the editor. The paper is neatly gotten up, is full of interesting items for its employes, and contains a review of the year besides some excellent contributions. The paper contains information for every district and will serve well the purpose for which it is intended.

Denied Access to Cincinnati

Toll lines of the Bell Telephone Company to Cincinnati, Ohio, and other places will not be available to subscribers of the Hamilton Home Telephone Company as a result of a decision handed down by the Supreme Court of Ohio.

Uncle Sam Controls Lines for Three Days

Exclusive control of all toll lines of the American Telephone and Telegraph Company was given over to the United States government at 1:30 p. m. May 5, for three days.

The action followed an advance announcement from Washington, D. C. Army posts, naval bases and shipyards throughout the entire United States were in direct communication with each other. The move was a part of a preparedness campaign which the war department recently inaugurated.

The toll lines for commercial use continued in operation while the government was making the telephone tests.

That the United States navy has at is disposal exceptional means of quick communication in case of war, was shown during the period, when both wire and wireless telephone apparatus of the American Telephone and Telegraph Company were successfully used to mobilize the na forces throughout the country and to communicate from shore with the battleship New Hampshire at sea.

Not a hitch occurred during the demonstrations. Perfect communication was established between sixteen of the government's naval stations on the four borders of the country and the navy department at Washington, while the wireless telephoning to and from the New Hampshire, which was cruising off the southern drill grounds, was a complete success.

Wireless Successful in Naval Test

The successful practical demonstration of the wireless telephone which enabled officials of the naval training station at Lake Bluff to talk with Captain Chandler on the bridge of his battleship, the New Hampshire, in Chesapeake Bay May 7, filled the naval authorities and preparedness experts with enthusiasm. The conversation was part of a series of experiments which the navy department is conducting in conjunction with the American Telephone and Telegraph Company and followed the demonstration in which officials at Washington talked with the New Hampshire and with various naval stations throughout the country. The navy department, as a result of the demonstration, intends henceforth to direct all its work and send all its communications by wireless telephone.

From the bridge of his ship Captain Chandler spoke into the transmitter:

"It is a wonderful achievement to be able to talk from Great Lakes to a vessel at sea connected through Washington by wireless telephone."

Commander Moffett at Lake Bluff, with his ear to the receiver, heard the words that were carried on currents through the air as plainly as if someone were telephoning from the corner drug store.

Roadside Service in Indiana

Clem Strauss, head of the Strauss service system, has come forward again with a scheme which will make motoring more of a pleasure than ever before. Strauss's original service to motorists who had the misfortune to break down in the city or country was a great idea, but the new plant makes the first system doubly a service.

Clem has had installed on all the main roads of Marion county 200 private telephones, all of which connect directly with the Strauss headquarters. It matters not where you may meet with an accident, the Strauss phone will be found only a short distance away, and from it you can get a hurry-up wagon from Strauss in a jiffy.

A call will bring a repair wagon at any hour of the day or night. The trip of the car and labor will cost you nothing. You pay only for the materials used. This is the newest, biggest thing in tire repair service in Indianapolis or any other place. On practically every mile of main roads in Marion county will be found the big yellow and black Strauss telephone box.

A charge is made of $2 a year for a key. Each key will fit any of the 200 boxes. The charge for keys is only to insure the company that their property is in the hands of responsible people. When one stops to consider the convenience this added service means to the motorists, especially to the women drivers, he wonders where the wonders of the automobile industry will end. About all a motorist in Marion county needs at the present time is a couple of good cigars or a box of candy so they can pass the time until one of the Strauss wagons arrives to make repairs and send them on their merry way again.

Southern Indiana Companies United

The first step towards the organization of Independent telephone interests of Southern Indiana has been taken at French Lick, where an association of the interests of this section was effected.

The first meeting following the organization will be held by the telephone men in Bloomington, June 20. More than a hundred companies of Southern Indiana have signified their intention of joining the association.

L. C. Griffith, president of the Seymour Mutual Telephone Company, is secretary-treasurer of the new league and other officers are S. M. Isom of Mitchell, president, and Phil Dilly, secretary-treasurer of the Dubois County Association, of Huntingburg, vice-president.

None but men who own the majority control of telephone companies can be members, although others in telephone work may become associate members. At the French Lick meeting constitution and by-laws were adopted.

New Standard of Transmission

Any telephone line over which may be heard the crowing of chanticleer nine miles away is capable of giving A-1 service, in the opinion of R. Huckoby, president of the Ashburn, Georgia, Telephone Company, expressed in a communication to the state railway commission in refutation of complaints against the workings of his line.

This telephone line extends from Ashburn to Ballard's farm, a distance of nine miles. Several complaints had been made to the railway commission by farmer-patrons against the service. Finally President Huckoby was called upon to defend himself and his company.

He replied with a verbatim transcript of a conversation he had with a complainant, while he was in the Ashburn office and the complainant at Ballard's farm. He declared he heard the fatrmer's voice distinctly, and that during a lull in the conversation he also distinctly heard the crowing of a rooster out in the yard.

"If that isn't satisfactory service, what is?" he asked.

Brevities of the Business

The Activities of the Whole Telephone Field Told in Short Paragraphs

PERSONAL NOTES.

F. L. Gilman, assistant superintendent of the Western Electric Company, has been transferred to the engineering department, with the title of assistant chief engineer, and during the absence of F. B. Jewett, assistant chief engineer, on sick leave, all of the divisions of the engineering department heretofore reporting to Mr. Jewett will report to Mr. Gilman. Mr. Gilman has been identified with telephone interests for twenty-one years. He graduated at Harvard in 1895 with the degree of A. B. *Magna Cum Laude*. On July 1, 1895, he entered the repair shops of the New England Telephone Company at South Boston, eventually becoming assistant electrical engineer of that company. On March 1, 1901, he took charge of switchboard engineering at New York. He remained for five years, at the expiration of which time he was in full charge. In 1906 Mr. Gilman was transferred to the New York shops, in charge of the manufacturing branch, and was later made superintendent. March 1 1909, found Mr. Gilman on the staff of Vice-President H. B. Thayer, and on March 1, 1911, he was sent to Kansas City as general manager of the Missouri and Kansas Telephone Company, becoming later general manager of the Bell Company of Missouri, and still later vice-president of the Pioneer Telephone and Telegraph Company, in charge of operating. On November 1, 1912, he was appointed superintendent of the telephone apparatus shops of the Western Electric Company at Hawthorne, and later was made assistant general superintendent of the Hawthorne Works, in charge of the technical, operating, inspecting, and installation branches, a position which he held until his recent transfer. While at Hawthorne he was vice-chairman of the educational committee and had charge of the Works training division of the apprentices in the manufacturing department. Mr. Gilman is a fellow of the American Institute of Electrical Engineers, a member of the American Society of Mechanical Engineers, and a charter member of both the Harvard Engineering Society of New York and the Association of Harvard Engineers.

F. L. Gilman.

It may not be generally known that about three months ago F. B. Jewett, assistant chief engineer of the Western Electric Company, found it necessary to give up work at the office because of trouble he was having with his eyesight. During the interim he has been under the care of a specialist at his home in Wyoming, New Jersey, and his condition has so far improved as to permit of his going south to recuperate.

May 18 at the Franklin Institute, Philadelphia, the annual presentations of the Franklin Medal and Cresson Medal of the Institute were made. The Franklin Medal, which is awarded annually to those workers in physical science of technology, without regard to country, who have done most to advance a knowledge of physical science or its application, was presented to John J. Carty, chief engineer of the American Telephone & Telegraph Company, and Professor Theodore W. Richards, of Harvard University, who was absent on account of illness. The Cresson Medal, which is awarded for discovery of original research adding to the sum of human knowledge, was presented to the American Telephone & Telegraph Company and was accepted for that company by Theodore N. Vail, its president.

Theodore N. Vail, president of the American Telephone & Telegraph Company was made vice-president of the newly organized National Agricultural Society of New York.

Announcement is made of the resignation of Herbert J. Jeffrey, as district manager of the Paducah Telephone and Telegraph Company, Paducah, Ky. Mr. Jeffrey first assumed charge in 1906, as local manager of the Home company. During his last administration the company and service has been doubled. Mr. Jeffrey will be succeeded by Mr. B. Y. Chambers, now assistant superintendent of the Central Home Telephone Company, of Louisville.

H. I. Barnes, of Joplin, Missouri, has assumed the management of the Union Telephone Company at Tipton, Iowa.

Harry N. Foster, traffic superintendent of the Chicago Telephone Company, dropped dead in the street at Wilmette, on May 4. Mr. Foster had gone there to take part in a moving picture for the company, and after the picture had been taken he was walking with W. E. Pierce, commercial superintendent, when he dropped to the ground. Mr. Foster was forty-two years old and was born in New England.

D. G. Williams for the past five years superintendent of toll line maintenance for the Michigan State Telephone Company at Detroit, has organized the D. G. Williams Realty Company and will do a general real estate business. Mr. Williams has opened offices in the Park building, Washington boulevard.

Frank C. Reading has been appointed manager of the Clearfield, Pa., exchange of the Bell Telephone Company.

On May 22, the sixtieth birthday anniversary of Bernard E. Sunny, president of the Chicago Telephone Company, was celebrated at the Blackstone hotel. Mr. Sunny was presented with a silver plaque on which had been engraved the autographs of all at the dinner.

F. B. Gleason has just returned from Tokyo to become general telephone sales manager of the Western Electric Company. "The war has affected the electrical industry in Japan in diminishing the supply of raw materials and in sending up prices," he says. "The telephone end of the electrical business has been in a more or less passive state, but the present year is marking a rapid advance in Japanese telephone development. The telephone business in Japan is run by the government, and its development has been slow, although it appears that the demand for telephones is far greater than the service offered. For example, the number of telephone stations in Japan is 200,000, while there are no less than 130,000 applications awaiting connections. In the regular course of events an applicant must wait several years before he is given telephone service unless he secures it by making an additional payment. The reason for the apparent lethargy in telephone development is a scarcity of government funds. In recent years, the cabinets have not been able to pass a government budget for extraordinary expenditures (under which head telephone development falls), and as a result these cabinets endure for a short period and resign, and new cabinets are formed and the cycle is repeated. The present cabinet has passed a budget for 1916 that will permit of a rapid advance in telephone development." In Tokyo, Mr. Gleason was far eastern manager of the Western Electric Company. He has been identified with telephone interests since 1902, when he acted as special agent for the Iowa Telephone Company. In the fall of 1904 he joined the Chicago organization in the telephone

F. B. Gleason.

department, dealing with non-contract customers. In 1907 he opened the Dallas house, and in 1909 was appointed Pacific district manager, a position he held until 1912, when he was transferred to Tokyo. Mr. Gleason was born in Red Oak, Iowa, and studied in the Universities of Chicago and Iowa. He graduated at the latter institution in 1901 with the degrees of Bachelor of Science and Bachelor of Law.

James S. Allen, who has been in charge of the exchange of the Michigan State Telephone Company at Chelsea, has been named the successor of E. N. Hardy, managing the Wyandotte exchange.

The Roadhouse, Ill., *Record* prints the following: William Burbridge, manager and one of the principal stockholders of the San Jose, Ill., Telephone Company, has been missing for several days and his relatives fear he has met with foul play.

Henry Dakin, who for nine years has been associated in responsible positions with the engineering department of the Chicago Telephone Company, has been appointed plant chief of the Detroit district of the Michigan State Telephone Company.

J. M. Alton, of San Francisco, has taken over the management of the telephone exchange in Visalia, succeeding A. H. Denison, resigned.

John Arndt, line man for the Chicago Telephone Company at Plano, Illinois, has been transferred to the Aurora territory.

E. N. Hardy, who has been for several years manager of the Wyandotte and Trenton exchanges of the Michigan State Telephone Company, has been promoted to the managership of the exchange at Flint.

Lawson H. Meyer, commercial manager for the Chicago Telephone Company at Gary, Indiana, has resigned to enter the drug business with his father, Frank B. Myer.

On May 3, Enos M. Barton, former president of the Western Electric Company, died at the age of seventy-two in Biloxi, Miss. Mr. Barton was born in Jefferson County, N. Y., and in his earlier career was a telegrapher. He became associated with Elisha Gray in an electrical machine shop in Cleveland, Ohio, under the firm name of Gray and Barton in the year 1869 after which the business was moved to Chicago and continued by the Western Electric Mfg. Company. In 1879 this company was absorbed by the Western Electric Company and Mr. Barton became president in 1887. He retired from the presidency in 1908 and became chairman of the board of directors, which position he held at the time of his death.

Bert J. Wheeler has been named as acting manager of the Gary, Ind., exchange of the Chicago Telephone Company.

Gouverneur Calhoun, a prominent official of the long distance telephone company at St. Louis, died at his home 3733 Washington avenue, on May 15. He was formerly district superintendent in St. Louis for the American Telephone & Telegraph Company and had since been its commercial representative with headquarters in that city. Mr. Calhoun was forty-eight years old and died from dilation of the heart.

Harold Olney in the employ of the Iowa Telephone Company at the Clinton exchange has been promoted to the accounting department in Davenport.

BREVITIES OF THE BUSINESS

ALABAMA.

Fifteen thousand dollars will be spent in improvements in New Decatur within the next few weeks by the Southern Bell Telephone and Telegraph Company. Most of the investment will go for new cables, eliminating the open wire work, says G. L. Smith, manager.

ARKANSAS.

The telephone exchange at Waldo has been purchased by M. Lavender, C. Stivers and E. M. F. Frisby, of Prescott. It will be under the management of Mr. Lavender.

A new switchboard has been installed in the exchange at Judsonia.

CALIFORNIA.

The Pacific Telephone and Telegraph Company will shortly commence the erection of a new building in Hillsborough.

The Magnolia Telephone Company will extend its lines east of town and also plans putting in an exchange.

Lack of a quorum prevented the annual meeting of the Fowler Independent Telephone Company, Fowler, doing other than to receive the annual reports, no other business being transacted. The present board of directors will hold over for another year.

Porterville has a total of 960 phone users, and shows the largest proportionate growth of any town of the valley.

GEORGIA.

An exchange will be installed in the Grady hospital, Atlanta.

IDAHO.

The Mountain States Telephone and Telegraph Company have about completed the network of rural lines in the Kuna district to be served from the Nampa exchange.

The Bell Telephone Company is putting in more than $50,000 in improvements in Blackfoot.

ILLINOIS.

The Central Union Telephone Company will shortly begin the improvement of the service between Rock Island, Davenport and Moline.

New cable to connect the Moline and Rock Island exchanges will be installed, and a marine cable will be laid between Rock Island and Davenport on the bottom of the Mississippi. Eight carloads of specially made cable have arrived, four being unloaded in Moline and four in Rock Island. The material will be placed in underground conduits extending along Seventh avenue, Rock Island, from the exchange to Forty-sixth street, and continuing along Fifth avenue, Moline, to the Moline exchange. The cable is of the 150-pair, 19-gauge type. Service between Rock Island and Moline will not be suspended during the time the new connections are being made. When the new cable is in and connected, the old one will be removed. Laying of the Rock Island-Davenport cable on the bottom of the river will not be undertaken until later in the year.

Massac County Mutual Telephone Company, Round Knob; capital stock increased from $4,980 to $7,500.

Montgomery County Telephone Company, Hillsboro; dissolved.

An additional toll line is being built between Sterling and Dixon by the Bell Telephone Company.

At the annual meeting of the Players' Club of the Chicago Telephone Company, May 13, the following officers were elected: F. R. Kasparek, chairman; R. M. Bennett, vice chairman; C. E. Sutton, secretary and treasurer; T. J. Hardy, director; A. P. Hyatt, master mechanic; A. T. Irwin, publicity manager; E. B. Moebius, musical director; R. D. Wilcox, chief electrician.

Seven Hickory and Morgan Township Mutual Telephone Company, Bushton; dissolved.

Harvard Telephone Company, Harvard; capital stock increased from $5,000 to $20,000.

There was a good attendance at the annual stockholders' meeting of the Northern Illinois Telephone Company in the rooms of the Commercial Club, Sandwich. The reports of the secretary and treasurer were very satisfactory to the shareholders. The balance sheet shows an increase of $2,000.00 over last year's business and future prospects are good. The company has reduced its floating and bonded indebtedness during the past year over $30,000.00. A large amount of cable will be installed in Mendota this year. At a meeting of the directors before the stockholders' meeting a quarterly dividend of $2.00 per share was ordered paid July 1. At the suggestion of the Illinois Commission of Public Utilities the business year of the company will now end with the calendar year, December 31st. The annual meetings of the stockholders will now be held on the third Wednesday in January instead of in May as heretofore. The retiring board of directors were unanimously re-elected, consisting of F. S. Mosher, J. N. Antoine, William VonOhlen, George Hicks, E. C. Mosher, Justin Latham, E. A. Manchester, C. A. Harbaugh and George S. Hyde. The board met immediately after the adjournment of the stockholders' meeting and re-organized by re-electing F. S. Mosher, president, J. N. Antoine, vice-president, E. E. Wallace, secretary and treasurer.

INDIANA.

Plans of the Richmond Home Telephone Company to expend between $20,000 and $25,000 in extension of the local telephone service in the immediate future were made known by William M. Bailey, superintendent and manager of the local office. The money will be spent for wiring and for new units in the city plant's office, which will increase the present possible number of telephones to 3,200.

Consolidation of New Long Distance Telephone Company, New Telephone Company, Indianapolis Telephone Company, forming the Indianapolis Telephone Company, Indianapolis, Ind. capital $8,000,000. Directors, William Fortune, Louis Hollweg, Frank D. Stalnaker, John H. Holliday, A. A. Wilkinson, John B. Elam, John N. Carey, Harry S. New, William L. Elder, L. C. Huesmann, George G. Snowden, William L. Moellering, Samuel G. McMeen, F. R. Huntington, Frederick W. Stevens.

The Southern Telephone Company of Indiana, successors to the Cumberland Telephone and Telegraph Company, paid into the city treasury of Evansville $7,666.28, the city's tax on the gross receipts of the company under its franchise.

The Commercial Telephone Company of Warsaw has let the general contract for the construction of its new building.

Southern Indiana Telephone Company, McCutchanville, amended Article 10 of its articles of incorporation.

IOWA.

The Board of Supervisors has decided to have an intercommunicating telephone system installed in the new court house at Sheldon.

W. J. Brownell of Hawarden, president of the Farmers & Merchants Telephone Company, which recently bought the Martin Telephone Company's holdings holdings in Webster City, has just bought three other telephone plants in Hamilton county. They are Blairsburg, Williams and Jewell and they cost him $40,000. The Farmers & Merchants Telephone Company now owns every telephone plant between Williams and Sioux City along the Illinois Central, with the single exception of Fort Dodge, as well as a string of plants north of this railroad. It is the largest telephone concern in Iowa and its general headquarters are soon to be moved from Hawarden to Webster City.

Central City Telephone Company, Central City. Capital $15,000. E. S. Wetherboe, president; J. R. Casey, secretary.

The telephone exchange at Kelly was out of commission for a short time on account of the lightning which struck the Foster home where it is located.

The Plymouth county Telephone Company will abandon its Struble office about the first of June and handle all phones connected with that exchange through the Le Mars office.

KANSAS.

H. D. Doty has purchased the Cunningham Telephone exchange, Cunningham, buying the system of John and Ben Pricheim.

The Arkansas Valley Telephone Company, Great Bend, has made arrangements to increase its capital stock $300,000 according to president H. E. Lindas. The money will be spent for improvements, and the extension of lines.

W. T. Summers, general foreman of the construction crew of the United Telephone Company, strung a line between Salina and Lincoln in five hours. The line was strung on the poles at the rate of six miles an hour.

A recent fire damaged the exchange of the Macksville Telephone Company to the extent of $300.

The telephone subscribers on line No. 6, Yarnold, are rebuilding their line straight into Stull.

At a meeting of Miami county Mutual telephone men, held recently at Paola, a county telephone association was organized, which will co-operate with the Kansas Mutual Telephone association. G. L. Chappelle, of Paola, was elected chairman of the telephone association, and Paul Laskie, of Bucyrus, secretary. Nine directors were elected.

MICHIGAN.

The Michigan State Telephone Company was refused permit to tear up Gratiot avenue between Seneca and Parker avenues, Detroit.

The Citizens Telephone Company of Marshall has given a mortgage to the Citizens Telephone Company of Grand Rapids for $33,600, which has been filed in the office of the register of deeds. The mortgage covers the entire equipment of the Citizens Telephone Company and is given for the purpose of entirely overhauling the local exchange and building extensions to it under the franchise held by the corporation.

Preparations are being made by the Michigan State Telephone Company to erect a handsome three-story structure on the northwest corner of East Bethune avenue and John R. street, Detroit, to replace the building which now houses the company's Market exchange. The new building will have frontage of 97 feet on East Bethune, extending back 116 feet on John R. Brick and reinforced concrete will be used to make the building absolutely fireproof. The plans call for stone trimmings, giving the structure an artistic effect. The lower floors will be used for handling the telephone business proper. The third floor will be arranged for convenience of the operators, providing a retiring room, lavatories, lockers, kitchen and dining room. The new building is made necessary because of the tremendous growth of population in the territory served by the exchange and the prospect of continued development.

MINNESOTA.

The Eden farmers recently organized a telephone company, and propose to run a line from Morgan into Eden. The following were elected officers: Rev. Paul Horn, president; Ferd Dittbenner, treasurer and manager; Fred Wilson, secretary; Wm. Wellnitz, George Green and August Kopischke, directors.

Twelve new patrons have been secured for the new telephone line which will be constructed north of Lamberton.

F. J. McDonald, who has been overhauling the lines and equipment of the Ellendale Rural Telephone Company, became its owner, taking the plant off the hands of the local stockholders to run it as a private enterprise.

The farmers of the Evergreen neighborhood have organized a telephone company, which will connect with the Bigfork Farmers' line. The poles have been distributed along the proposed route and wires will be strung and telephones installed as soon as possible.

The central office of the New Ulm Rural Telephone Company will be a one-story structure.

The telephone exchange in Morgan will be moved from its present quarters to the State Bank building.

A deal was completed recently whereby a majority of the stock of the Citizens Telephone Exchange, in Montevideo, was sold to the Northwestern Telephone Company of Minneapolis for the sum of $85,000. The Northwestern takes possession June 1.

MISSOURI.

May 11 the four day meeting of the toll chief operators of the Bell telephone system of the Southwestern and Mountain states came to a close with a banquet in the assembly room at the hotel Muehlebach, Kansas City.

At the annual meeting of the directors of the Farmers' Mutual Telephone Company held in Oregon, the following directors were elected for the ensuing year: James M. Campbell, George S. Stephenson, William Mahan, Curtis B. Whitmer, William Stevenson, Harry Milne, Edward Fuhrman, Ernest Oppenlander and Jacob Bucher.

MONTANA.

Midway Telephone Company. To build lines from Savage to Lambert, Fairview, Smith Creek and Burnes. Incorporators: J. J. Hart, O. M. Oppegaard, E. B. May and M. L. Hoffstott, all of Savage. Capital, $10,000; $1,250 subscribed.

The Havre-Box Elder Telephone Company stockholders held a meeting in Havre and the following officers were elected: President, Nick Faber; vice-president, Ed Redwing; secretary and treasurer, George Forge. In addition to the above Dr. A. E. Williams and John Kincello were elected as a board of directors to serve for the ensuing year. It was determined at the meeting to extend the lines over Beaver creek.

The Lavina Mutual Telephone Company, with headquarters at Lavina, filed incorporation papers with a capital stock of $20,000, of which $2,205 has been subscribed. The new company is being promoted by Otto Knoll and associates of Lavina.

Dissatisfaction with the rates charged by the Mountain States Telephone and Telegraph Company, farmers of Laurel have called a special meeting May 18, for the purpose of discussing the telephone situation.

A. O. Hedberg of Carrington, N. D., has been investigating the proposition of installing a telephone system in Bainville, and he has received much encouragement from the business men of the town. While he refuses to make any definite announcement it is believed that he will launch the project and go through with it this summer.

The Farmers' Mutual Telephone Company, with its chief office at Alma, in Hill county, filed articles of incorporation with the secretary of state. The business of the company will be confined to the county named. The capital stock is $10,000, of which $250 has been paid in. The incorporators are J. Lee McClellan, Harry A. Baldwin, J. B. Maddock, R. E. Nelson and A. G. Luedeman.

NEBRASKA.

The petition that the telephone franchise in Utica be cancelled was not acted on by the village board at the regular meeting held May 1 but was postponed until the next regular meeting in June.

The North Antelope Telephone Company is making quite an extension north of Clearwater. They are building an entire new line which will have 15 or 16 patrons. The new addition starts at the Clearwater cemetery, where the old line runs now, and runs north one mile, then west one mile, then north to the Neiderhide place with various spurs catching all the people in that neighborhood.

A new rural telephone line has just been established by farmers living northwest of Randolph and is known as Line No. 293. The new line has twelve patrons.

NEW JERSEY.

Plans for the erection of an annex to the telephone exchange building in Paterson have been filed with building inspector John Quigley. The new building, to be of brick construction, is to be erected at 170-176 Van Houten street, and will cost $75,000.

NEW MEXICO.

The stockholders of the New Mexico Telephone Company, Santa Fe, held their annual meeting April 20 and re-elected the old board of directors for the ensuing year. After the adjournment of the stockholders' meeting the new board of directors met and elected John K. Stauffer, president; Irma De Arcy, vice-president, and E. J. De Arcy, secretary and treasurer.

NORTH CAROLINA.

Jackson Telegraph and Telephone Company, of Sylva. Capital stock, $30,000. Subscribed stock, $5,500. Incorporators, J. P. Swift, H. B. Adkins, and W. F. Swift, all of Waynesville.

NORTH DAKOTA.

A new telephone system will be installed at Lisbon.

The Curley Telephone Company is the name of a new farmers' telephone line extending from Glen Ullin into the country northeast for a distance of thirteen miles with sixteen subscribers. F. L. Shuman, district manager for the North Dakota Independent Telephone Company, was present and assisted in the organization. The officers of the new company are as follows: President, Henry Geitzen; vice-president, Jos. P. Braun; secretary, Henry Carter; treasurer, A. J. Bullamore. The directors are Henry Geitzen, Jos. P. Braun, Henry Carter, A. J. Bullamore and Sidney Bullamore.

Sterling and vicinity will soon be equipped with telephones, two companies having been organized, one north of town and one south.

The board of directors of the Gaylord Telephone Company met at Gelfield and placed orders for the necessary material to completely equip the system.

F. L. Shuman, district manager for the North Dakota Independent Telephone Company at Bismark, has purchased the Mandon Telephone Company, taking the holding of C. E. V. Draper.

At a meeting of the directors of the Emmons County Telephone Company, the line west of Hazelton will be extended.

The Northwestern Telephone Company at Jamestown has just installed a new switchboard and completed the remodeling of the building.

The telephone exchange in Ellendale was destroyed by fire May 10. Loss unknown.

A new telephone line is being constructed from Brinsmade to Comstock.

The Sanborn Northern Rural Telephone Company was organized in Judge Murphy's office in Sanborn and the following officers were elected: President, C. O. Lindgren; vice-president, C. H. Potter; secretary, Albert Gulmon; treasurer, F. L. Schwehr; directors, Jacob S. Sauer, Leopold Schwehr and Alvin Gulmon.

OHIO.

Contract has been let for the erection of the new Bell Telephone Company's new building on South Third street, Martin's Ferry.

At a recent meeting of board of directors of the Middletown Telephone Company it was decided to build 17,000 feet of cable in this city during the coming summer. The new cable lines will mean extensions into the newer sections of town as well as including a line on Yankee Road from Meadowlawn to Georgetown. A new switchboard will also be installed.

The Citizens' Telephone Company, a Delaware corporation, has sold the telephone properties in Coshocton and West Lafayette, Ohio, to the Citizens' Telephone Company of Ohio for $57,000.

George H. Metheany, of Lima, was re-elected president of the seventh district of the Ohio Independent Telephone Association, at the meeting held in Lima, May 18. G. W. Vernon, of Findlay, is secretary of the district.

OKLAHOMA.

At a meeting held recently in which representatives of the city, the commercial club and the businessmen's association met with the Pioneer Telephone and Telegraph Company, an agreement was made whereby Ardmore agrees to permit the elimination of the usual 10 percent discount on the monthly rentals and the telephone company agrees to construct a new reniforced concrete building and to install the most modern plant in the state at an expense of not less than $100,000. The switch board is to be of the most modern pattern.

OREGON.

Articles of incorporation have been filed with Corporation Commissioner Schulderman by the Northwestern Long Distance Telephone Company, of Portland. The incorporators are C. W. Fulton, Jay Bowerman and F. H. Crosby, and the capital is $500,000. The company has been operating as a foreign corporation, and it is understood that it will now withdraw as such.

PENNSYLVANIA.

Owing to an increasing demand for telephone service in West Philadelphia, the Bell Telephone Company will establish another central exchange at the southeast corner of Fifty-seventh and Chestnut streets. The company recently acquired from John M. Afflick a lot 104 by 242 feet, at the corner mentioned, on which it will erect a handsome four or five-story central exchange building. Plans for the structure have not yet been decided upon, but it is understood that the building will cover the entire lot. The principal purpose in establishing the new exchange is to relieve the Woodland exchange, whose business is extremely heavy. What name will be given to the exchange has not yet been announced.

The last of poles for the combined telephone and power line from the center of Ellwood City to Hazel Dell are now being placed by the Bell Telephone Company on Lawrence avenue. By an arrangement with the city, the municipal electric line will use the same poles as the telephone company.

Preparations are being made by the Bell Telephone Company for the installation of a conduit system to take care of their wires on State and Walnut streets, Sharon. It is estimated that the work will cost about $50,000. Engineers have been working on the project and have practically completed plans for the work. The company is making preparations to abandon its toll lines on Broadway, Farrell, and will run the cables along Fruit avenue and along New Castle street to Sharon, where the wires will enter the new conduit on Prospect Heights, which is to be built.

The Northwestern telephone exchange, New Milford, is now located in Mrs. Nettie Laff's house on Main street, and has an all night service.

E. J. Coover, district manager of the Bell Telephone Company of Pennsylvania, announces the reduction, from 10 to 5 cents, of that company's telephone toll rate between Allentown and Bethlehem, effective June 1. Under the reduced rate all calls between the two cities will be made by telephone number only, just as local calls are made, and a three-minute talking period will apply in all cases.

Mrs. Nellie K. Mosser, 119 North Sixth street, and Miss Margaret Roeder, 501 Turner street, have been appointed telephone operators at the new Court House in Allentown.

The Western Pennsylvania Independent Telephone Association held their quarterly meeting in the Fort Pitt hotel, Pittsburg. About 80 independent companies were represented by 125 delegates. Several visiting representatives were present from other parts of Pennsylvania and other states. Improved service, efficiency and other matters for the benefit of the services were discussed. A committee on changes in the by-laws will report at the next meeting, which will be held in Erie in July.

The regular monthly meeting of the Northern Pennsylvania Telephone Society was held in the Chamber of Commerce rooms, Wilkes-Barre, April 28. Three new directors for two years were elected as follows: P. S. Harkins and F. M. Stanton, Scranton; R. W. Kintzer, Wilkes-Barre. Several amendments were passed, the principal one being the transferring of the meetings to Scranton on alternate years. The election of officers for the ensuing year resulted as follows: President, P. S. Harkins, Scranton; vice-president, R. W. Kintzer, Wilkes-Barre; secretary and treasurer, F. M. Stanton, Scranton.

The Bell Telephone Company is now distributing the summer issue of the local directory in Latrobe.

A convention of Independent Telephone operators met in Uniontown, May 22 and 23.

WISCONSIN.

The Wisconsin Telephone Company had a "visiting day" May 12 and 13 at their new Orchard exchange, 877 Lapham street.

Plans will be ready about June 12 for the erection of the main office and exchange of the Wisconsin Telephone Company on Broadway, between Wisconsin and Mason streets, Milwaukee. The building will be of reinforced concrete, steel and hollow brick construction. It will be eight stories high and will measure 120x120 feet. It will be equipped with six electric passenger elevators.

George Smith, of the Sunnyside Telephone Company, has secured the contract for constructing the Benton City telephone system. There will be about twenty-four miles of line commencing near Biggan station on the O. W. R. & N. and following the canal to Benton City and a local system on the Benton Highlands. The new telephone system will be conducted by the directors of the Sunnyside Irrigation district of Benton City, and will give high-class service with long distance connections. Work will be started as soon as weather permits.

Work is to be rushed with the reconstruction of the Twelve Corners-Mackville telephone line which was taken down in the recent sleet storm. At the stockholders' meeting it was decided to construct a line similar to the old one, but stronger.

The Eau Claire River Telephone Company has been organized by farmers living in the towns of Rolling and Harrison. The following officers were elected at the meeting: President, Calvin Balliet; vice-president, Charles Schoette; secretary, Joseph Wild; treasurer, Engelbert Stuiber; trustees, George Hunt, Fred Goeman, G. F. Gratz.